This Week in The Iron Age

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Now That It's Over---

NOW that it's over, we can all breathe a sigh of relief and settle down to the business in hand. And this includes the next President.

No one need envy him his job. It is the toughest one faced by any of our Presidents since Lincoln's time. He is going to need all of the help that he can get from every man and woman in the United States, and we believe that he will get it.

Feelings ran high during the campaign and some unpleasant things happened. They generally do when feelings run high. Unpleasant things happened, even more of them, when Lincoln ran for office.

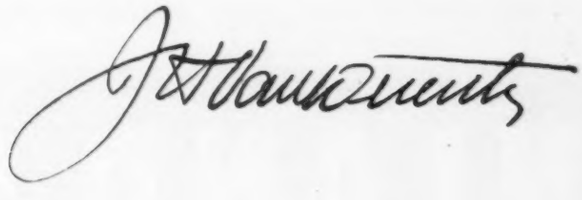
But now these things will be forgotten, for that is part of the American way of life. We take our ball games and our elections seriously. We are extreme partisans while the contest is going on and sometimes some of us hurl epithets and even pop bottles at the players. But after the series is over and some team wins the pennant, we forget all about it.

Emotionalism ran particularly high during this campaign because the whole world has the jitters. No nation and its people could possibly escape the psychopathic effect of the European cataclysm, however remote from it. We were afraid of being drawn into this cataclysm, or if drawn into it of not being able to survive it. Hence the partisanship and the eggs and onions and epithets. They were not directed at either candidate; they were being hurled at Hitler.

Every citizen who voted for Mr. Roosevelt undoubtedly believed that *he* was the man who could save America. Every citizen who voted for Mr. Willkie undoubtedly believed that *he* was the one man who could and would do it. But neither belief was correct. No President can save or destroy his country. It takes the people to do that.

Our big job now is to save America. To make it so strong that no enemy of America, from within or without, can destroy it. That is a job which calls for the best efforts of a united people.

For the next four years, let's change the name of our country. Let's call it the United People of the United States.



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Setting a Price for Plating

By ADOLPH BREGMAN
Consulting Engineer, New York

—Demonstrating the wide difference between a price set by hard purchasing practice and by a practical time study

IT is an old story that a great deal of contract work in every line is being done today barely at cost, "in order to keep the wheels turning." Especially is this true during the dull seasons of the year when it is felt necessary to take almost any job in order to keep a working force together. Shrewd manufacturers have learned to take advantage of this situation by having work made up for stock during the off seasons, at substantial savings.

This practice is, of course, legitimate; it is good business. If the contract shop wants to take work at prices on which he makes no profit, it is his "privilege." However, a purchasing practice has crept into the industry which is not good business, but sharp business. It consists of getting prices from a variety of suppliers, small and large, stable and unstable, reputable and even "shady," in order to set a mark for all bidders to shoot at. Here is a typical method of procedure.

The purchasing agent calls in a number of platers to bid on a sample. They are asked to quote "immediately," after a quick inspection of the article. Some are foolish enough to do so and variations in quotations may be as wide as 300 per cent. The wiser bidders ask for a sample lot to try out before quoting.

The purchasing agent sends sample lots to a chosen half dozen bidders (including the lowest, regardless of his stability). Shortly thereafter the agent collects his quotations, including those who have quoted on sight and those who have run trial lots. He then calls in two or more of the most reliable platers and offers to give them the work at the lowest price quoted, regardless of the reliability of the quoter. The platers who are offered the work take solemn oaths to the effect that it cannot be done at such figures, but the purchasing agent shows them bills (of course, hiding the name of the biller and showing only the price). In far too many cases one or more of the chosen few will shrug his shoulders and say, "Well, if someone else can do it, I ought to be able to. Give me the order." So he receives an order for a substantial quantity and goes to work.

On the first lot, he finds, after figuring his costs, that he has lost money, so he complains bitterly. But the purchasing agent, being wise in the ways of sellers as well as in the art of purchasing, suggests that as he goes on with the job, his production rates will improve, and since it is a very big job, he will undoubtedly show a substantial profit over-all. So the plater takes another lot. He then finds out that he has again lost money, but perhaps not so much. So he squauks again, the conversation is repeated and he takes another lot.

This process is repeated with one or more additional platers and in time the whole job is completed and none of the platers has succeeded in making it show a profit.

One such instance recently came to the attention of the writer, who was called in by a contract plater to investigate a job which

TWENTY-FIRST in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

he felt was unprofitable. The plater expressed himself as wide open to suggestions of any kind. Perhaps his methods called for revision. He had been in the plating business only 30 years, so perhaps he did not yet know it thoroughly! Perhaps his cost figures were inaccurate. Perhaps—perhaps anything at all. He wanted to find out what it was all about.

As a result, a test run was made on a lot of 100 chandelier holders shown in the accompanying illustration. An examination of the holders, which were made of cold rolled steel, showed that the following operations were necessary in order to obtain the desired finish.

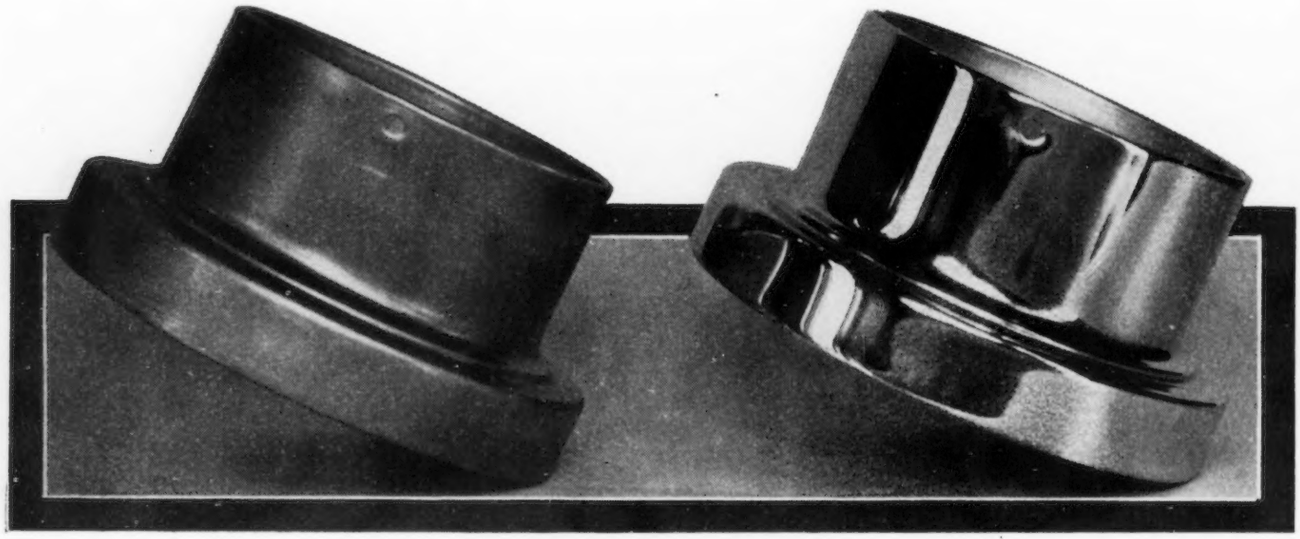
(1) Grinding with No. 120 emery.
(2) Polishing with emery flour.
(3) Polishing with tampico brush.
(4) Rack for copper plating.
(5) Degrease.
(6) Clean in alkaline cleaner.
(7) Rinse.
(8) Copper plate.
(9) Rinse.
(10) Dry in sawdust.
(11) Unrack.
(12) Buff the copper plate.
(13) Rack for nickel plate.
(14) Clean in alkaline cleaner.
(15) Rinse.
(16) Pickle.
(17) Rinse.
(18) Nickel plate in bright nickel solution.
(19) Rinse.
(20) Unrack.
(21) Rack for chromium plating.
(22) Chromium plate.
(23) Rinse.
(24) Dry in sawdust.
(25) Buff chromium plate.

The article was then ready for packing and shipping.

It was decided to time the above operations in detail, to obtain the complete direct labor cost, to which would be added the regular overhead or burden of this particular plant which would include the packing and shipping.

The job was given a clear track in the plant; in other words, no other work was permitted to interfere with it. The men were told that this was a test run and instructed to do a thoroughly good job, but to work at their regular pace, which could be carried on day in and day out, in order to give a true picture. Actually, the result of these instructions was that the men did an excellent job, so good that no pieces were rejected under the most careful inspection; but also they tially faster than their regular rate and which, in the writer's opinion, they could not keep up day after day. worked at a pace which was substan- In other words, the figures were the best that could be obtained as the men had already had experience with this work and were going at their very top speed, "putting on a show."

The time records are shown in the accompanying table. It should be noted that the timing of a number of the operations was combined as it was not practical to segregate them. So, for example, operations 4 to 11 inclusive, covering racking for copper plating, all the way to unracking, are lumped together as the copper plating operation. Similarly, the bright nickel plating operation includes operations 13 to 20 inclusive, and the chromium plating operation includes operations 21 to 24 inclusive.



CHANDELIER holder of cold rolled steel. This is to be copper, nickel and chromium plated. What should the price be in lots of 5000.

o o o

The selling price may be determined by either of two methods:[1]

(1) Direct Labor × 2½ = selling price.
5.12 × 2.5 = $12.80/100 pieces.

(2) Total polishing time @ $3 per hr.

Operation 1—Emery	= 53 min.
2—Flour	= 53 min.
3—Tampico	= 60 min.
12—Copper buff	= 45 min.
24—Chrome buff	= 25 min.
Total	= 236 min.
	= 3 hr., 56 min. or 4 hr.

4 × $3 = $12 per 100 pieces.

The price which the plater had been receiving for this job was 9c. per piece.

In order to make sure that no possibilities were being overlooked, it was decided to attempt to eliminate the emery flour polishing (operation No. 2) from a small number of pieces, in order to reduce the cost. (In this instance 88c. per 100, which together with overhead and profit would have meant a reduction of 2.2 cents per

[1] For the development of these methods, see "Metal Finishing Costs," by Adolph Bregman, THE IRON AGE, March 28, 1940, pp. 28-31.

piece.) In other words, a half dozen pieces were ground with 120 emery and then polished on a tampico brush, copper plated, buffed, etc., etc. No difference was noted until the bright nickel plating operation was completed, after which these half dozen samples were spotted instantly by the presence of a speckled appearance instead of the desired high luster, especially on the rim, the edges and the fillets where the deep draw had opened the surface of the steel. Consequently, this attempt at cost reduction was a failure. The possibility was also discussed of substituting a greaseless polishing operation for two or more of the three polishes employed, but a trial on a few pieces showed this to be unsatisfactory.

Other methods of cutting polishing costs (always the largest item in a metal finishing job) also came under discussion. It was obvious, however, that the quantities involved in this job made automatic polishing impractical. The total volume involved was approximately 100,000 pieces, sent in lots of 5000. There was no assurance at any time that the job would run on long enough to amortize the cost of automatic polishing machines. The same applies, of course, to automatic plating machines. As it was, all the polishers were provided with special hand chucks to fit the pieces, allowing them to turn freely under control by the experienced polishers, to get the maximum speed possible by hand, consistent with satisfactory work. It must be repeated for emphasis that in the writer's opinion the rate shown in the above table was probably greater than the expectable day-in and day-out production.

Time Record—100 Pieces

(1) Emery @ 95¢ per hr.	= 53 min. = 88¢
(2) Flour @ 95¢ per hr.	= 53 min. = 88¢
(3) Tampico @ 90¢ per hr.	= 60 min. = 90¢
(4-11) Copper Plating:	
Plater @ 80¢ per hr.	= 30 min. = 40¢
Helper & 40¢ per hr.	= 30 min. = 20¢
(12) Copper Buff @ 95¢ per hr.	= 45 min. = 72¢
(13-19) Nickel Plating (Bright):	
Plater @ 85¢ per hr.	= 15 min. = 21¢
Helper @ 50¢ per hr.	= 20 min. = 17¢
(20-23) Chromium Plating:	
Plater @ 67½¢ per hr.	= 20 min. = 23¢
Helper @ 42½¢ per hr.	= 25 min. = 18¢
(24) Chrome Buff @ 85¢ per hr.	= 25 min. = 35c
Total Direct Labor	= $5.12 per 100 pieces

The outcome of this test was that the plater shortly thereafter paid a call on his customer and declined, with thanks, to do any more of this work at less than 12c. a piece.

What did the customer do when confronted with this ultimatum? It would be pleasant to report that he saw the light and was willing to pay a fair price. In this instance, however, being located in a district where platers abound, he could always find someone else who was willing to "keep trying," so he is still getting his work done at less than cost. For that matter, according to latest reports he is shopping around for even lower prices!

Steel Corrosion by Molten Nitrates

THE corrosion of steel containers by molten alkali nitrates is important in the heat treatment of aluminum alloys in salt baths. The process has been investigated on a laboratory scale by P. Lloyd and E. A. C. Chamberlain, and reported recently to the Iron and Steel Institute (British).

The corrosion of steel by molten alkali nitrate was investigated with special reference to the effects of temperature and of impurities in the salt. It was found that the scaling which takes place under these conditions is different both in character and in extent from scaling in a gaseous medium at the same temperature. Although the rate of oxidation increases markedly with rise in temperature, local heating of a part of the metal container does not in itself give rise to abnormal scaling at that point.

Exploratory tests on certain irons and steels showed that Armco iron had a high resistance to this form of corrosion; investigation of this aspect of the problem is continuing. The protection provided by aluminum coatings was uncertain. Alkali chlorides are common impurities in the commercial salts used for the heat treatment of light alloys, and it was found that they are responsible for a marked acceleration in the rate of attack on the steel: 0.1 per cent exercises a considerable influence.

It was found that decomposition of nitrate to nitrite does not proceed to completion and that salt mixtures containing much nitrite are oxidized by the atmospheric oxygen. In one series of tests with sodium salts at 500 deg. C. and in air the equilibrium concentration of nitrite was found to be about 4 per cent. It was concluded by the investigators that with the sodium salt the presence of 5 per cent or more of nitrite should be helpful in suppressing the corrosion, but with the eutectic a greater addition may be necessary on account of the lower intrinsic dissociation temperature.

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Forge Shop Practice at N. & W.

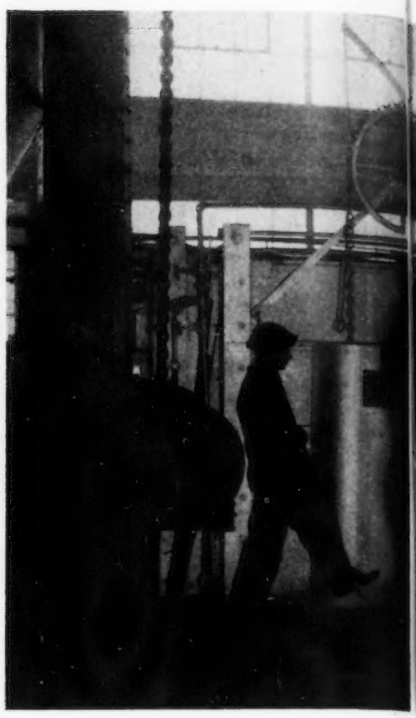


FIG. 1—Charging a powdered coal fired under the

MUCH of the material used in the manufacture of locomotive and car parts in the Norfolk & Western Railway smith shop at Roanoke, Va., is remanufactured in the smith shop itself from scrap material of both wrought iron and steel of so-called welding quality. By this is meant that scrap material is actually remanufactured into billet, bar and narrow plate form, and not simply that waste crops from the plate shears, for example, are sent to the cutting torch to shape for some particular part application without reworking the metal itself.

The process used is not much dissimilar from that used to make wrought iron by the old muck bar method. It will be recalled that in making wrought iron by hand puddling, after the pig iron is freed from impurities and the purified iron obtained in the form of a ball, the latter is squeezed to expel most of the slag and rolled into rough bars, designated as muck bars, or No. 1 iron. The muck bar is then sheared into small pieces, heated to welding heat in a furnace, hammered under a steam hammer and sometime later rolled into the shape desired. This process is known as busheling and the product is called hammered bloom iron. More usually, however, the muck bar is sheared into short lengths which are piled one upon another, bound by wire, heated to welding temperature and rolled into bars. This material is known as No. 2 or single rolled iron. For further refinement the No. 2 iron is sheared into lengths, piled, reheated and rerolled to form No. 3 or double refined iron.

Railroads still use appreciable quantities of this material. In fact, most of the wrought iron reworked at the N. & W. shops is double refined wrought iron scrap or welding quality steel scrap, that is, dead soft, low carbon plain steel. The iron or steel is in the form of plate scrap, reduced by shearing if necessary to an average size of 4x6 in. and averaging ½ in. thick. About 400 lb. of these scrap pieces is piled in overlapping fashion on a pallet and is brought up to welding temperature in a powdered coal fired furnace. Usually the first batch is placed in the furnace at the end of a shift and is left overnight, the night watchman turning up the furnace to full heat in the early hours of the morning. See Fig. 1.

In the morning the pallet is withdrawn and the material is brought to a 4500 lb. steam hammer. The first operation is to attach a staff, Fig. 2. Then the piled scrap is "singled" or knocked down to a slab about 4 to 5 in. thick. The slab is next cut in two with a fullering tool, forming two "chunks." These chunks are allowed to cool before being piled on top of each other, are reheated, restaffed and hammered down to billet size or "doubled" to make a refined iron. Practically the same process is followed for the forging quality steel.

Such steel or wrought iron slabs are later worked down to form a variety of locomotive parts, most of them stress carrying members, such as driving box equalizers. That the reworked material is of high quality is attested to by the fact that much of it must pass Magnaflux inspection for internal pipes, seams and flaws.

The economy of the process is to be found in the difference in the average sales price of No. 2 wrought iron scrap (about 1c. a lb.) and new double-refined wrought iron (about 6c. a lb.). Also, this reworking of old material helps maintain the big furnaces in operation as well as the large hammers, not to overlook the crew men. In other words, this work absorbs some of the overhead burden or fixed charges on what might otherwise be partially idle equipment, besides providing steadier employment to furnace and hammermen.

The driving box equalizer, Fig. 3, is typical of a highly stressed steel part successfully forged from salvage material. Welding quality steel is singled into a chunk, then doubled into a billet, which is later reduced in thickness to suit the particuar part—in this example 1⅛ in. thick. It will be noted from the part sketch, however, that at each end there are bosses 2 in. (sometimes 2½ in.) thick and in the central section there is a rocker bearing plate 2½ in. wide. The thickening and

furnace with scrap iron or steel pieces which are later forged or "singled" into chunks steam hammer.

HAMMER or squeeze welding is used extensively in building up locomotive and car parts by "laying on" methods, employing both steam hammers and upsetting type forging machines. Considerable of the raw material used in the smith shop at Roanoke is remanufactured under the steam hammer from scrap wrought iron and welding quality steel.

o o o

By FRANK J. OLIVER
Machine Tool Editor, The Iron Age

shaping for the bosses is done in an upsetting forging machine while the inside rocker extension is a piece hammer-welded with the aid of a special die. It might be asked why the rocker extension could not have been formed by folding over the edge of the flat stock. For the particular equalizer shown, this is not possible because of the depth limitation of the forging machine, which is 9 in., whereas the overall rough forging depth is ultimately 10½ in.; hence the necessity of tacking on a chunk later.

But to return to the beginning of the process, the slab is first cut to preliminary outline by means of a gas cutting machine using suitable templates. This equipment is located in a side bay of the smith shop. For reasons of backing up the piece during the upsetting operation, the rough outside contours of the unformed bosses are on center. Sufficient metal is left to gather the boss material. Later the boss centers are bent down to a line tangent to the rocker base as shown for the completed part. Equalizers, being a standard item, are put through in sizeable lots and one end is upset at a time before the position of the backup post is changed for upsetting the other end. This upsetting is done in a two stage die, the flat of the work being held in a horizontal plane for the first or squeeze operation and turned 90 deg. into a vertical plane for the second and final upsetting operation. The taper leading up to the bosses is also shaped in the second cavity.

Hammer Welding

Next step is to hammer weld the rocker piece under a 1600-lb. leg hammer using the special step die shown in Fig. 4. This die, which is in the form of a double 45-deg. step, not only completes the hot juncture of the metals, but also forms the 24-in. radius of the rocker, a job previously laboriously performed on a shaper. The only finishing required on this rocker now is to rough grind it with a portable pneumatic grinder in the machine shop.

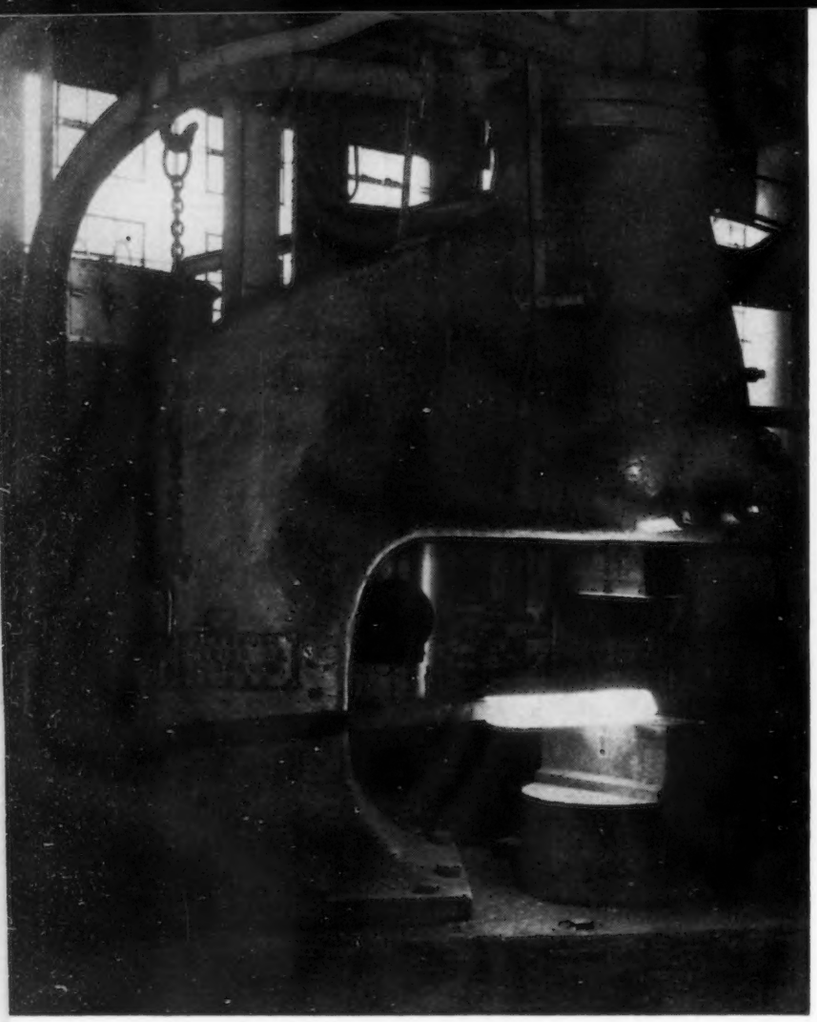
Final forging operation is to bring the boss centers down into line with this rocker crown and form the inside radius of the equalizers at the same time. This is readily accomplished hot in a 1500-lb. steam drop hammer through the use of form shoes supported laterally in a special fixture. The equalizers are then matched in pairs and sent to the machine shop for drilling the bushing holes and grinding the rocker radius. It is estimated that about $4 per pair of equalizers is saved over the former method of taking heavier stock and working it down under the steam hammer instead of employing hot-heading and putting-on methods.

Welding in a Hot Header

Another example of putting on metal by welding in conjunction with a hot heading operation is the building up of the bosses on the facing stems of the Pitt coupler used in passenger cars. Building up metal to a total depth of 3¼ from 1¼ in. flat stock is too much to expect from any upset forging machine unless it is done in a number of stages, in two or more setups. Instead, at the N. & W. smith shop, filler pieces are laid on each end as shown in the sketch, Fig. 5. Ez welding compound is used as a flux to lay on the scarf and at forging heat sufficient adherence is obtained from the weight of the piece to enable the parts to be carried to the upsetter without the filler piece dropping off.

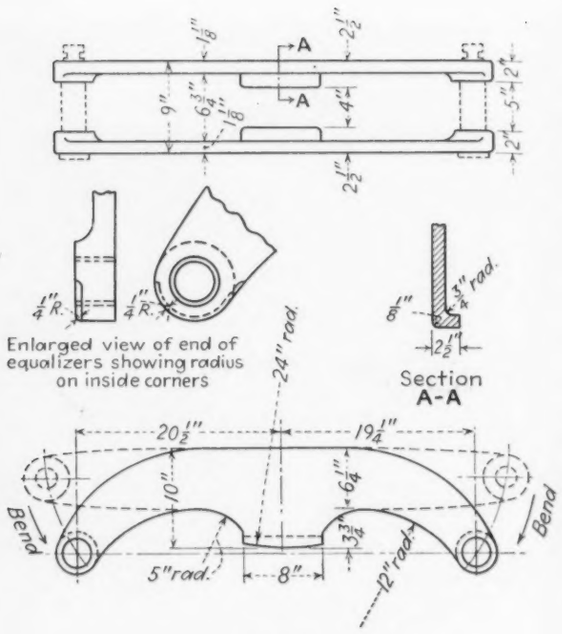
It will be noted that the square boss on the right end is offset all on one side of the flat. In the first impression of the forging machine die, however, the initial gathering and welding distributes the metal fairly well about the centerline of the flat blank. In the second, or reheading die, one side (the lower, in the sketch) is pushed back into line with the side of the stem, thus raising the boss to its finished height. This piece was previously roughed out from heavier stock on a forging hammer and then machined.

With the present procedure, there is no machining done on this piece except to drill the bushing holes indicated and



ABOVE

FIG. 2—Scrap wrought iron or steel of welding quality is remanufactured under this 4500-lb. steam hammer by "singling" or "doubling" operations. The long staff (about 20 ft.) protects the hammer men from flying scale.



ABOVE

FIG. 3—Details of a typical locomotive driving box equalizer. Highly stressed engine parts like this are forged out of remanufactured raw material.

BELOW

FIG. 4—Special step dies are sometimes used to assist in "putting on" metal. In the example shown a rocker bearing boss is being attached to a driving box equalizer in the formative stage after the ends have been upset.

drill and countersink a few rivet holes not detailed. The length of the finished forging is determined by the position of the backstop of the forging machine.

Making Spring Bands

Another example of welding by forging as carried on in an upsetting type forging machine is shown in Fig. 6. This locomotive spring band with rocker eye is made up of two pieces of flat stock bent up into U-shape. Piece *A* is first deeply indented or marked for the bends by a piece of spring steel bent into U-shape with one leg longer than the other, the longer leg being used as a handle. Then the two ends of the 1-in. thick material are knocked down to ½ in., drawing them out and rounding the ends in the process. Bending is done by hand sledges. Depth dimension 6⅛ in. is a controlling one, and is determined during the

upsetting and forging operation (which is in effect an assembly operation of pieces *A* and *B*) by a stake over which the hot pieces are slipped. To make a job like this possible on a 4-in. forging machine, the toggle mechanism is disconnected and the side holding dies removed. The upsetting operation not only forms the semi-circular ends of the projecting lugs, but also completes the weld between the adjoining faces, at the same time filling out the thickness of the lugs to 1¾ in. as indicated in the drawing.

Still another example of building up material by pressure welding and forming in an upsetting machine is given by the spring band, Fig. 7. Total metal thickness at the rocker contact boss is 1⅝ in., yet this piece is built up from ⅝ in. stock. Overlapping is not sufficient to build up the thickness to more than 1¼ in. or less, considering the effect of upsetting. Hence a small filler plate is introduced between the overlap of the original flat stock. This filler piece must be held in position prior to welding by a filler plug inserted in a hole cold punched in both the filler and in the end of the stock. The upsetting operation completes the surface welds, welds the plug and forms the 15-in. rocker radius. Material is welding quality steel.

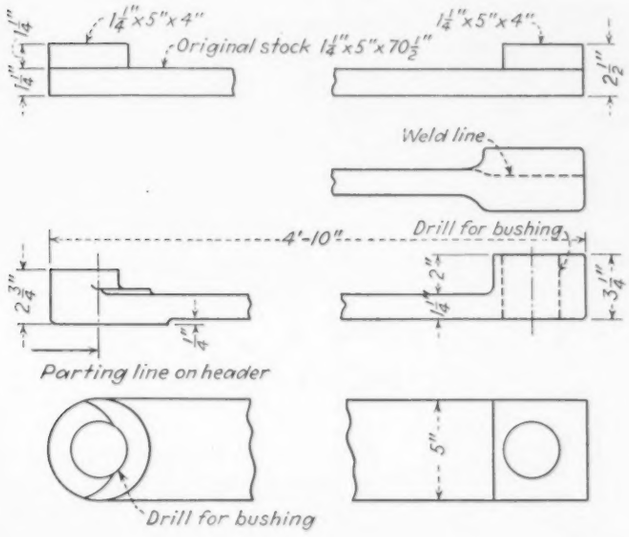


FIG. 5—The heavy bosses on this Pitt coupler stem are built up by filler pieces prior to hot upsetting.

Building Up Worn Parts

Draft gear side links fail by cracking through the reinforced hub at the ends of the slots, shown in the part drawing, Fig. 8. A standard procedure has been adopted for building up each end at this point with new metal. A piece of welding quality steel 4½x5x⅝ in. is laid on the end which is then brought up to welding heat in an open front furnace, and the reinforcing hub is reforged in a 4000-lb. steam drop hammer. The die employed is purposely made oversize so that the excess metal goes into widening the piece as well as filling up the slot.

The work of trimming the sides and end, punching the slot, straightening the link and embossing the date of reclamation on the flat is all performed in a special set-up in a double-throw crank press of extra width to accommodate three dies in a row, making this a progressive operation. As shown in Fig. 9 the trimming die is in the center, punching die set is at the left and stencil and straightening die at the right. The latter is a spring backed double action die. Earlier practice called for straightening the side links by hand and punching the slots cold. It is estimated that a saving of $3 per pair is made over the manufacture of a complete link from new material. The same equipment is of course available for manufacturing new side links.

Die Forging Gas Cut Parts

A good example of where gas cutting and drop forging has replaced costly machining operations is in the manufacture of spring hangers and spring shackles for tank tenders. As can be seen in Fig. 10, the part has a rectangular shaped yoke in which the wall sections are not all straight, one having a semi-circular face. In the spring shackle (which has no threaded shank) there are two facing sections of 1 9/16 in. radius in place of only one in the spring hanger. The material is reclaimed steel and is forged from a remanufactured chunk 3½ in. thick. The rectangular hole is cut out with a torch, starting from a drilled hole.

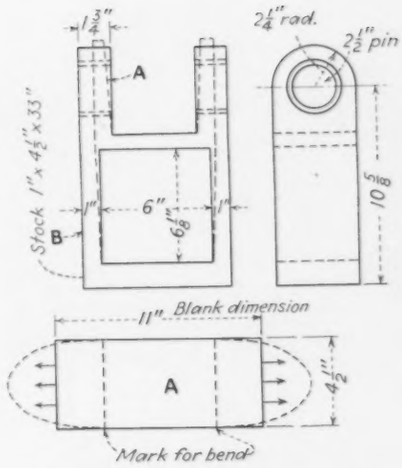


FIG. 6—Spring band with rocker eye. This piece is formed from two flats bent as shown in U-shape and pressure welded in an upset forging machine.

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Previously the 1 9/16-in. radius was formed in the machine shop by roughing out with a slotter, chipping with an air hammer and finishing up with a portable grinder. The labor alone cost about $4. Now this piece is finished in a matter of minutes after the oxy-cutting operation through the use of a relatively simple drop hammer die. The piece is laid on its flat side and the parting line is through the middle as indicated. The extra stock thickness is used to fill out the radius, and by trimming the part hot, the

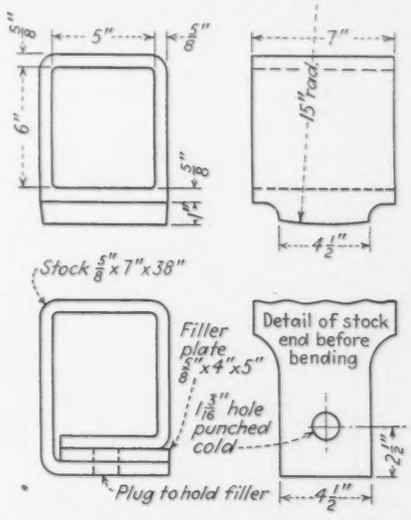
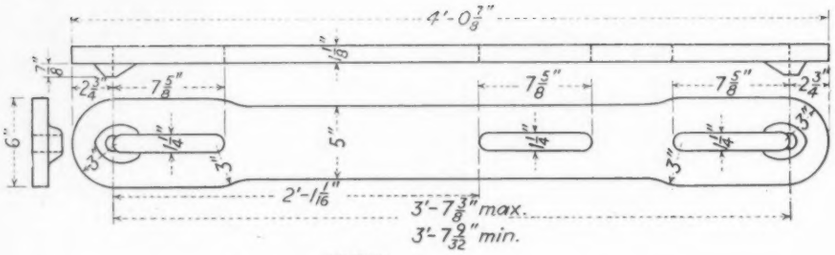
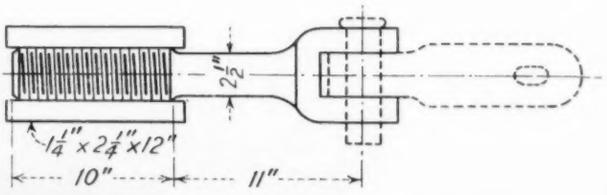


FIG. 7—Another type of spring band formed from flat stock and eventually consolidated by hot upsetting methods.



ABOVE

FIG. 8—Typical draft gear side link that is built up after wear in service by putting-on material by the hammer welding method.



BELOW

FIG. 11—Threads on these trailer spring hanger yokes became badly worn in service. To restore the surface for the threads, two pieces of steel 1¼ x 2¼ x 12 in. are wired on the shank, brought to forging temperature and knocked down to cylindrical shape.

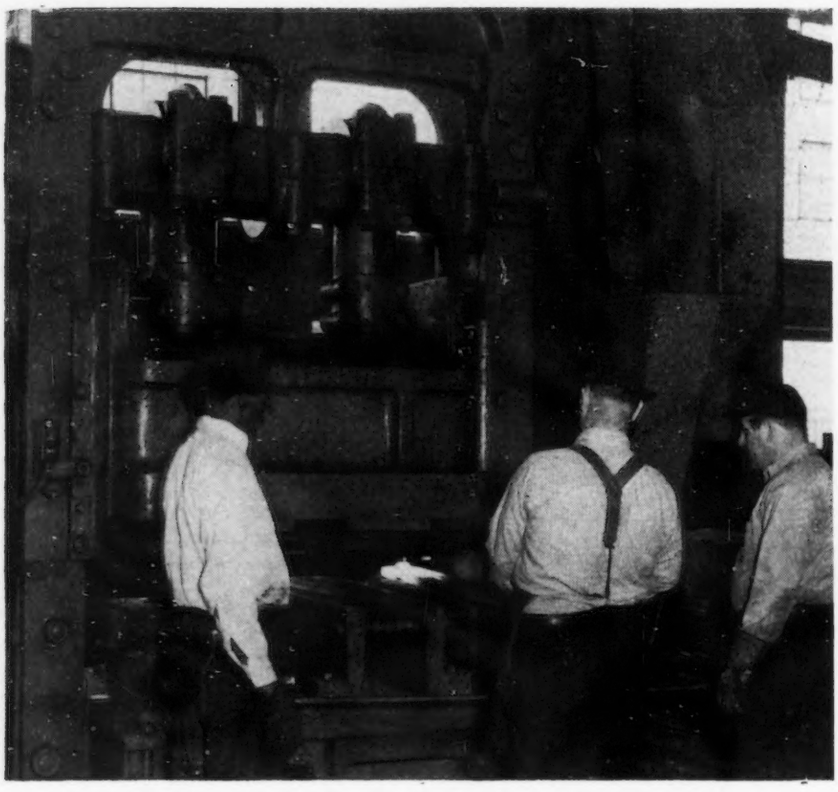
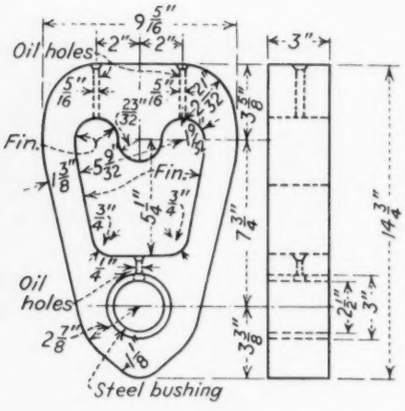
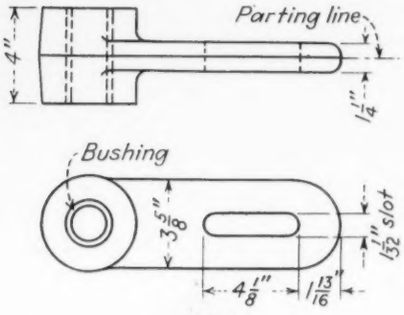


FIG. 9—Combination tools are used in this double crank press to perform trimming, punching, straightening and embossing in progression on draft gear side links.



ABOVE

FIG. 12—Swing center hangers are rough forged under the steam hammer out of remanufactured chunks and are later finished up in drop hammer dies. Practically all machining operations have been eliminated.



ABOVE

FIG. 13—Forging methods on this spring hanger link have been so modified as to reduce subsequent machining operations to a minimum.

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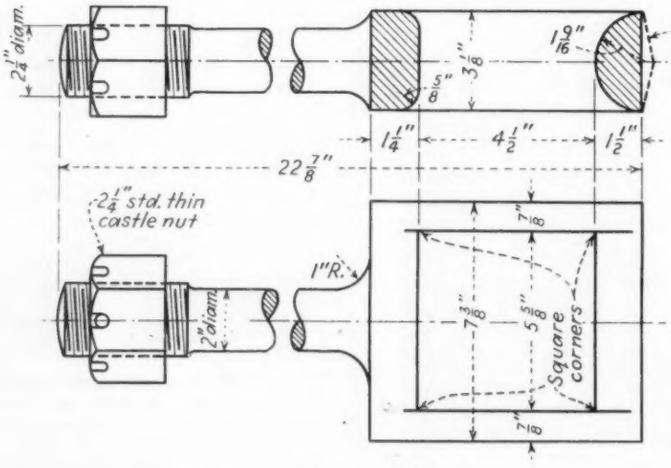

LEFT

FIG. 10—This spring hanger for a tank tender has the opening in the yoke cut out by gas torch and the sides finished in a drop hammer die, replacing a large amount of previous costly machining operations.

forging draft is removed on the outer sides of the yoke. These were previously machined. Flash at the parting line inside is removed at the same time. As the job is now set up, the only machining operation required is that of threading the shank. This is done directly from the forging, with prior turning of the o.d.

The swing center hanger, Fig. 12, is another piece forged out of salvage material. Because of the heart shape of the piece it is possible to get two blanks out of one chunk by forging the staff alternately at each end. The blank is rough cut to shape on the hammer with the aid of a steel template, and is then finished up in a drop hammer die. Excess material goes into a thin web section in the center of the piece as well as the flash on the outside. The outside profile is trimmed hot in a press and the center section is punched out hot with a loose plate punch, which also removes the draft angles at the rocker bearings. The only machining operation necessary is to drill the hanger pin hole at the top, locating this hole by template engaging the two lower hanger pockets.

Machining Operations Reduced

Wherever possible, forging operations are performed in such a manner as to reduce subsequent machining operations to a minimum. The spring hanger shown in Fig. 13 is a case in point, a forging that is knocked out in two drop hammer dies and a trimming and punching press. The roughing die has three impressions, one a nicking impression used to nick the 4¼x4¼x5½ in. billet before breaking down the flat shank of the piece in a flat or second section of the die. The third impression rough shapes the head by rounding the end. The finish die has a single impression, leaving but a small amount of flash around the parting line of the die halves, which are identical. It should be noted that the piece is laid in the die so that the draft angles come on non-critical surfaces. Originally the piece was parted in the die at 90 deg. to the present position and this left the draft angles on the pin boss faces, necessitating later machining operations. These faces need not be machined with the present setup.

Handy Bending Press

Though there is not enough work to keep this particular machine in daily use, a 200-ton horizontal hydraulic benching press or bulldozer installed a few years ago has proved to be an extremely valuable tool. It has sufficient capacity to bend the heaviest rails hot. Aside from track work, such rails are used, for instance, in making curved side stakes on flat cars converted for carrying pulp wood. As many as 16 85 to 100-lb. rails have been bent on this machine in 8 hrs. Another typical job is forming coupler yokes. A special fixture has been built for this work which has a number of advantages. As shown in the photograph, Fig. 14, the fixture is a scissor-like arrangement with adjustable toe holds on each arm to constrain the ends of the yokes while they are being formed from the flat. The pivot point slides against spring pressure and the initial action of the links attached to the special crosshead (which is permanently fixed to the press ram) is to close in the scissor arms, thereby putting the piece in compression and bending, the reaction being taken against the movable pivot point on the back side of the yoke. Final forming with interchangeable radius blocks on the arms is done against a fixed stake or post bolted to the press bed. It is apparent that this type of bend tends to thicken the yoke sections at the bend radii by end compression, which is absent when hot work is simply wrapped around a post.

Other jobs worked on this hydraulic bending press is the hot forming of large crane hooks around anchor blocks, also the cold bending of T-iron sections such as are required in tender tank roof construction.

FIG. 14 — Special fixture devised for forming coupler yokes on a 200-ton hydraulic press.

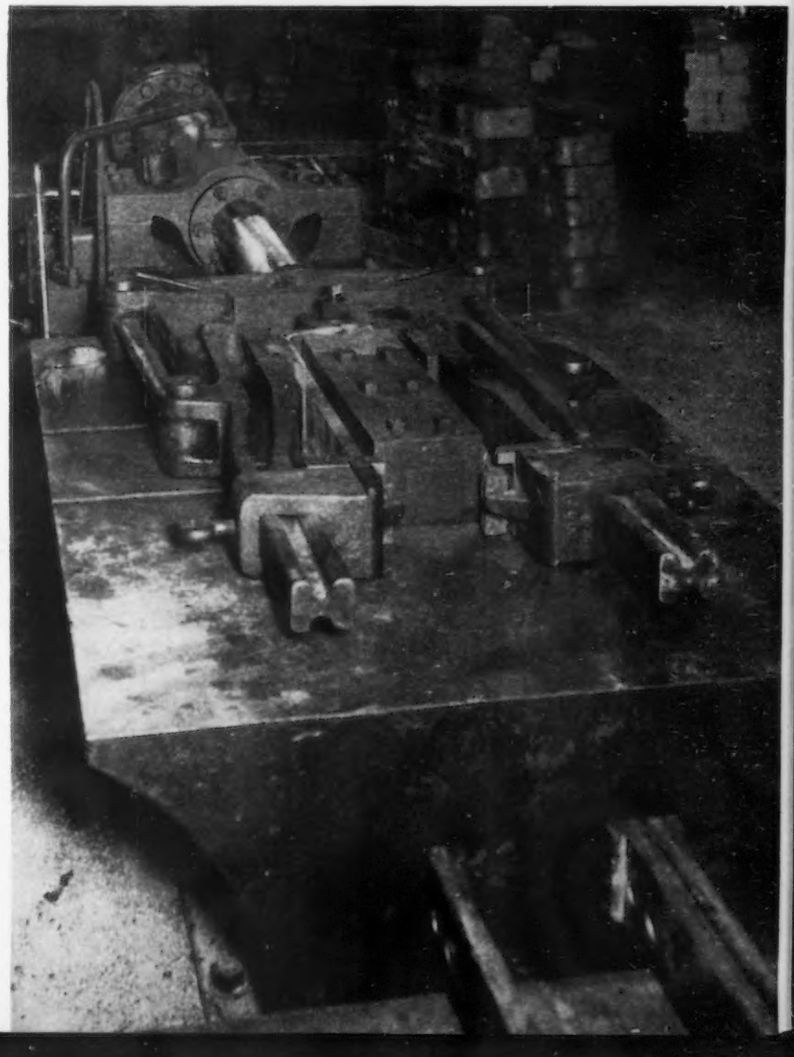

FIG. 15 — Completion of the closing action by the fixture on the yoke arms, the starting motion of which was shown in Fig. 14.

How to Bend

STAINLESS steel rolled section bent after being embedded in a solid bar of Cerrobend. No buckling or spreading.

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WITH the rapid growth of the use of thin wall tubing in many fields, particularly the aircraft industry, manipulation problems have become of major importance, and the production of perfect bends has been a matter of increasing difficulty.

Many materials have been used as fillers in tube bending with a certain measure of success. Resin, pitch, sand, lead, spiral springs and internal mandrels have been satisfactory up to a point in preventing buckling, flattening or rupture of the tube wall, but frequently fail when the bend required has been in any degree acute, or when the gage of the tube wall has been light. Sand is difficult to pack tightly enough to give sufficient support to the tube wall. Lead has a setting shrinkage which results in comparatively poor support, and, further, its high melting point precludes its use with light alloys. Resin and pitch have given fairly good results, but fail on the sharper bends, and in addition are messy and not a little dangerous to handle. Spiral springs and internal mandrels are, in general, limited in use to the gentler bends.

A very serious objection to all these fillers, other than the spring and mandrell, is the difficulty experienced in completely removing all traces of the filler after bending. Small particles left in the tube and subsequently becoming dislodged may cause serious troubles in service, or if left in the tube give rise to regions of marked weakness after processes involving heat treatment.

Cerrobend, an alloy of bismuth, lead, tin and cadmium, has peculiar properties that make it an ideal filler for tube bending.* It has an extremely low melting point—160 deg. F.—which is much less than the temperature of boiling water. It has been used successfully in the bending of tubing with walls as thin as 0.007 in. to small radii. This filler conforms so snugly to the inside of the tube that the latter can be bent as though it were a solid bar. This quality is due to the fact that the alloy *expands* slightly instead of contracting on solidification.

Molten Cerrobend normally cools and crystallizes slowly, resulting in a coarse crystal structure and is quite brittle in this condition. However, if it is rapidly chilled, it acquires a fine-grained structure which renders it very ductile.

In using this alloy for bending metal tubing, the alloy should be put in a clean ladle and covered with water. The water is heated to the boiling point, which completely melts the Cerrobend. Prolonged heating should be avoided as this tends to raise the alloy to too high a temperature. The boiling water is poured off the top of the ladle into the tubing, one end of which has been closed tightly with a cork or other stopper. The hot water preheats the tubing and guards against cold sets during loading.

The molten Cerrobend is now poured into the tubing, displacing the lighter water. When the tube is filled with molten alloy, it is plunged *quickly, corked end first,* into a tank of cold water. This insures a fine crystalline structure in the alloy, which makes it ductile and easy to bend.

As it has a low thermal conductivity, Cerrobend cools very slowly, even when water-cooled. After chilling, the tubing and its filler should be allowed to attain room temperature before bending. Almost any type of bending equipment can be used if the bends are made slowly at uniform speed and uniform loading. Too much speed or uneven application of power may cause failure. In the case of thin wall aluminum or duralumin tubing bent to a small radius, the bending should be done in multiple stages rather than all at one time.

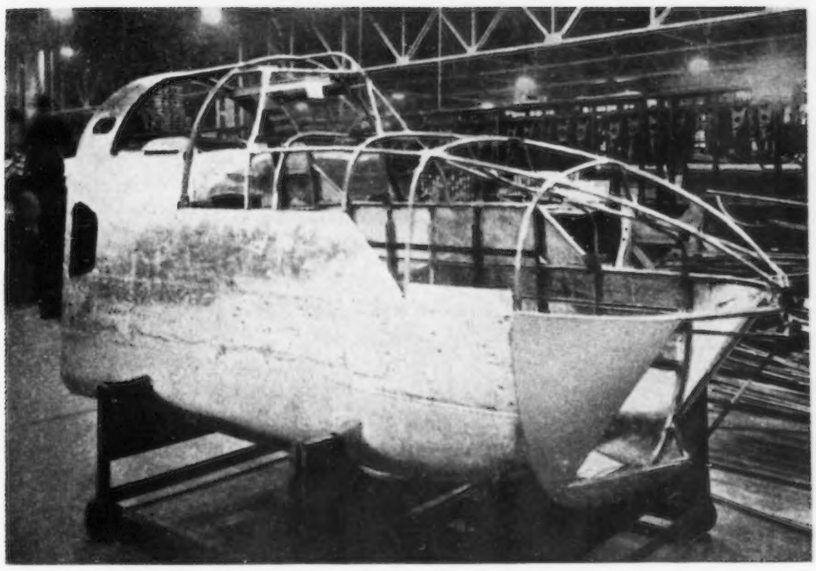
Cerrobend may easily be removed from the tubing by heating in a steam bath, boiling water or hot air at temperatures approximating the boiling point of water. The use of a bare flame is not advised because the tube wall may be overheated or even burned. The metal can be drained out of the tubing in a molten condition and used again and again.

"Tinning" of tubes on the inside is said not to occur, except under unusual conditions. It can be avoided by dipping the tube in light engine oil before the molten metal is poured into it.

If the tubes are oiled before loading there is no possibility of the alloy com-

* The use of bismuth alloy for locating and securing die parts was described in THE IRON AGE, issue of Feb. 8, 1940.

Tubes and Sections



MODERN aircraft construction. All tubes shown in this aircraft nose frame have been bent with Cerrobend.

ing into contact with the tube wall since the chance of the oil film being broken at the operating temperature of 212 deg. F. is extremely remote. Tests carried out by the Royal Aircraft Establishment (England) have proved that no alloying of the Cerrobend with tube wall takes place and approval of its use has officially been given by the Ministry provided the tubes after unloading are cleaned by blowing with steam or by a pull-through to sweep out any small beads of Cerrobend which may be retained in the oil film and possibly cause interference during subsequent treatment.

When the tubing is of too small diameter to permit pouring the molten metal into it, the alloy can be drawn into it by suction without trouble. This practice is generally followed with tubes ¼ in. in diameter or less.

The Cerrobend method has been applied successfully to the bending of copper, brass, duralumin, plain steel and stainless steel tubes. Tubes plated with chromium or nickel can be bent without danger of the plate flaking off.

It is said that the alloy has found special favor in airplane factories, for bending fuel, oil and hydraulic pipe lines. Tubes used for constructing airplane frames are also formed by the use of Cerrobend. Tubes of irregular section can be bent as readily as round tubes.

A most valuable development of the use of Cerrobend is in the forming of rolled or extruded sections. The need of complicated rolling machines for this work has been obviated. The procedure is to cast the alloy in a suitable mold completely to embed the section, and then bend the block of alloy round a former of dimensions allowing for the thickness of alloy surrounding the section. Under these conditions (particularly if the former is grooved exactly to accommodate the cross-section of the alloy block and prevent any cross-sectional distortion), it is impossible for the section to ripple or spread in any direction and perfect bends are achieved.

AN aluminum tube 0.25 in. in diameter hand wound round a ⅛-in. former with no rippling or buckling. Also, bronze tube of 0.0035 in. wall thickness for pressure gages bent with Cerrobend with complete absence of rippling.

Flame Hardening Standardization

By A. L. HARTLEY
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IN three previous sections of this five-part report, the author covered the characteristics of three types of iron and the effect of various heat treatments on the microstructure and hardness of each material; data on the flame hardening of unalloyed, chromium-nickel, and chromium-molybdenum cast iron by the progressive method; and standardized operating conditions for the hardening of flat surfaces. Herein, experimental data are presented on the hardening of flat surfaces. Herein, experimental data are presented on the hardening of steel parts by the progressive method.

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THE standardization of operating conditions for progressively flame hardening steel parts is much less involved than those encountered for cast iron. This is primarily due to the fact that a great deal of information is available concerning the desired heat treating cycles and microstructures for all of the commercial alloy steels commonly used. With this information as a basis it is only necessary to establish flame hardening conditions which will produce structures that duplicate those obtained when proper furnace hardening practices are employed. These conditions can be readily established by using a series of test blocks of the general design of the part to be hardened. For example, a series of blocks having widths ranging from ¼ in. to 4 in. and of the same general design as shown in Fig. 6 (see Oct. 24 issue) may be hardened under various operating conditions until suitable case depths and microstructures are obtained. The curve in Fig. 20 shows a set of conditions which will produce a hard case 3/32 in. to 5/32 in. deep.

The photomicrographs shown in Fig. 21 were taken from a specimen of SAE 4145 steel flame hardened in accordance with the data as tabulated in Fig. 20. The photomicrograph F-314-A shows the pearlitic base metal just below the transition zone. The photomicrograph F-315-A shows the structure approximately 0.005 in. into the transition zone. It should be noted that the amount of ferrite is very appreciably reduced in this zone. However, this can be more readily observed in the photomicrograph F-339 of the same zone. This second photomicrograph was taken after the specimen was etched to a sufficient depth to bring out the hard constituents which are starting to form and cannot be clearly distinguished from ferrite particles in a reproduced print. As may be observed from the hardness data as tabulated in Table IX, scleroscope hardness has increased from 28, as shown for the base metal, to a range of 28 to 40. At a depth of 0.020 in. into the transition zone the acicular structure becomes more definite and the ferrite particles are smaller and more scattered. The scleroscope hardness at this depth is 38 to 63. Photomicrograph F-317 shows the definite acicular type structure produced at a depth of 0.040 in. It may be observed from the photomicrographs taken at a depth of 0.060 in. and on the surface of the flame hardened specimen, that a fine acicular structure continues throughout the hardened zone. In order to make a direct comparison between the furnace hardened structure and the flame hardened structure, a small cube of the same steel used for this test was hardened and oil quenched according to recommended practices. The structure produced is shown by the photomicrograph F-340. It may be clearly observed that the flame hardened structures are equally as good if not superior to those produced by furnace hardening.

Although the data, as shown by the

curve in Fig. 20, was developed for SAE 4145 steel, the photomicrograph shown in Fig. 22 illustrate that the results produced when SAE 3140 steel is hardened in accordance with the same data are entirely satisfactory.

It should be noted from these photomicrographs and the hardness data as tabulated in Table IX that the transition zone is broad, ranging from 0.020 in. to 0.030 in. or 0.035 in. It is felt that this broad transition zone is absolutely essential if flame hardened parts are to be used where excessive shock and fatigue conditions prevail. Although the base metal as shown in the series of structures considered is pearlitic, an equally good transition zone is obtained if the steel has previously been heat treated and drawn back to a Brinell hardness of 269 or 321. Of course, this treatment would produce a sorbitic base which would gradually transform to the martensite in the case or hard surface. It may be noted from Fig. 20 that the distance between the work surface and the tip of the torch is 7/16 in. for the steel part rather than the ⅝ in. used for cast iron parts. Extensive experimental work has shown that there is no tendency for the steel surface to overheat when these operating conditions are employed. However, it has also been found practical to increase this distance to 15/32 in. or ½ in. without appreciably affecting the depth of hard case produced.

All of the steels used for flame hardened parts should be purchased to closely controlled metallurgical specifications. An example of two such specifications are shown.

Purchasing Specification No. 4 FS
(Forgings)

Grade:

SAE number 4145 standard analysis is acceptable. However, a carbon content of 0.42 to 0.48 is more desirable.

Grain Size:

This steel to have 6 to 8 grain size as checked by the McQuaid-Ehn test.

Grain Structure:

This steel to be furnished with a lamellar pearlitic structure.

Heat Treatment:

This steel to be normalized at a temperature above the upper critical and cooled at the proper rate to produce the desired grain structure and hardness.

Hardness:

This steel must be within the Brinell hardness range of 187 to 217, with a desired hardness of 207.

Purchasing Specifications No. 4 HS
(Forgings)

Grade:

SAE 4145 standard analysis is acceptable. However, a carbon content of 0.42 to 0.48 is more desirable.

Grain Size:

This steel to have 6 to 8 grain size as checked by the McQuaid-Ehn test.

Heat Treatment:

This material shall be properly normalized and heat treated to the required hardness.

Hardness:

This steel must be within the Brinell hardness range of 269 to 302.

In a similar manner specifications for other grades of steel can be made. Although much more elaborate specifications could be drawn up for large consumers, those shown here have proved entirely satisfactory.

All of the steels flame hardened in this investigation have been fine grained as classified by the McQuaid-Ehn test. However, other investigations have reported that this factor has very little if any effect on the results obtained.

Quenching Medium

It is a well known fact that SAE 3140 and SAE 4145 steel are generally quenched in oil if the furnace method of heating is employed. However, a 5 to 10 per cent soluble oil quenching solution has been found entirely satisfactory for spray quenching both grades in small sections, that is where the surface being hardened is not more than ¾ in. wide. Heavier sections of SAE 4145 steel are generally quenched with a water spray. Although difficulties have not been encountered with the quenching mediums as mentioned, if maximum hardness is not absolutely essential a soluble oil solution may be

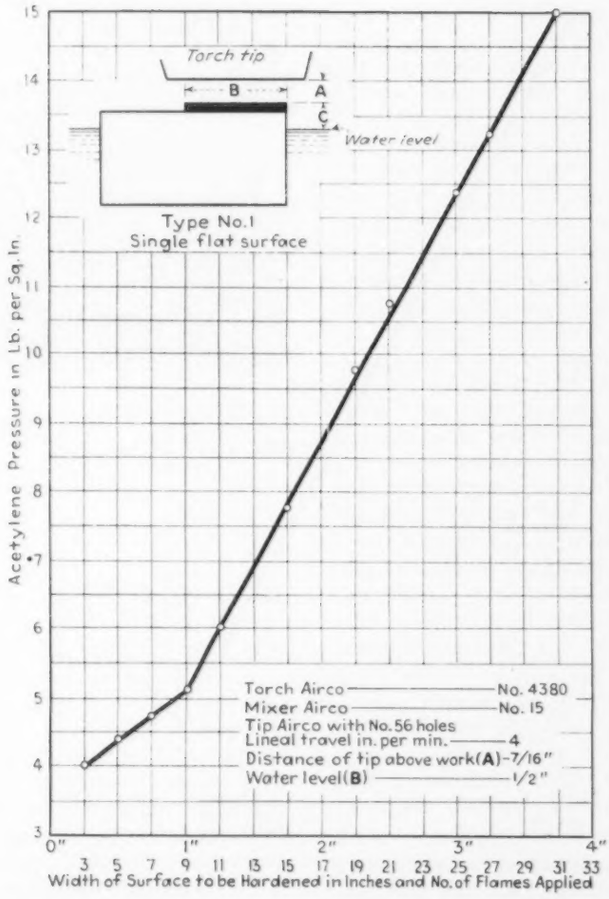


FIG. 20—Satisfactory operating pressure to produce a 3/32 in. to a 5/32 in. hard case on SAE 4145 steel. This curve applies to flat surfaces of the same basic design as that illustrated. The hardening is carried out under the conditions shown.

employed for all sizes of surfaces and the concentration may be slightly increased if it is so desired. This will, of course, reduce the hazard of surface checks.

Although the type of soluble oil used for the quenching medium may not be of major importance, Socony Vacuum Hob-o-Sol has been used for all tests herewith considered. It is a sulphurized type that was designed primarily for gear hobbing. The solution is of a much more oily nature than some of the other types and leaves an oily film on the parts, thus eliminating rust and discoloration. It should be clearly understood that there may be other types of soluble oil which will give equally as good results.

Although extensive experiments on hardening steel parts other than flat surfaces have not been considered in this series of investigations, unquestionably accurate operating charts could be prepared for flame hardening parts which have designs similar to those shown in Figs. 11 and 12. (See issue of Oct. 31.)

An example of a large part regularly flame hardened on a production basis is shown in Figs. 23 and 24. These parts are made of SAE 4145 steel. They range in size from 14½ x7½x63 in. long to 12½x7x48 in. long. They are hardened on four sides and must be free from soft corners or soft streaks. These results are obtained by grouping torches as shown in Fig. 24 and hardening an entire surface at one pass. As may be observed, the water level is within ⅛ in. of the surface to be hardened. This is essential to conduct the heat away from the outer corners at a sufficient rate to prevent hardening on the adjacent faces. It may be noted that the two end tips are equipped with adjustable deflectors. These have been found to be absolutely essential to prevent the hot gasses from causing excessive turbulence in the water. This turbulence has two detrimental effects. The first is that it will blow the water away from the point where the heat is being applied and will permit corner hardening. The second disadvantage is that the water will interfere with the burner action and frequently blank out or extinguish the flames.

The two wide sides of the bar are first hardened and then the two narrow sides are hardened. The set up for hardening the narrow sides is identical to that shown in Fig. 24 with the exception that the water level is raised to within 1/16 in. of the surface to be hardened. This precaution is absolutely essential to prevent the rehardening of the previously hardened faces. With these practices carefully followed there is no danger of either cracking the corners or of producing soft spots or streaks. The parts as shown in Fig. 23 have an average hardness of 85 to 90 sclerescope which is equivalent to 60 to 62 Rockwell C. A sample part 12½ in. wide was hardened and broken. This part showed a uniform penetration of hardness of ⅛ in. Although there was a very slight decrease in the depth of hardness at the point where the tips were separated, this was of very small magnitude and there was no decrease in the surface hardness.

These bars were formerly made of SAE 2315 steel, carburized and hardened. This process necessitated 22 machining operations, eight of which can be eliminated when the flame hardening process is used.

The operations which can be eliminated are herewith listed in tabular form:

(1) Renormalize after rough machining.
(2) Sand blast.
(3) Finish plane.
(4) Carburize after semi-finish machining.
(5) Sand blast after carburizing.
*(6) Straighten after carburizing.
(7) Sand blast after hardening.
*(8) Straighten after hardening.

* The particular bars which are illustrated in Figs. 23 and 24 do not require the straightening operation. However, there are many very similar bars of lighter proportions which must be straightened, and the operation will be discussed in the following brief analysis.

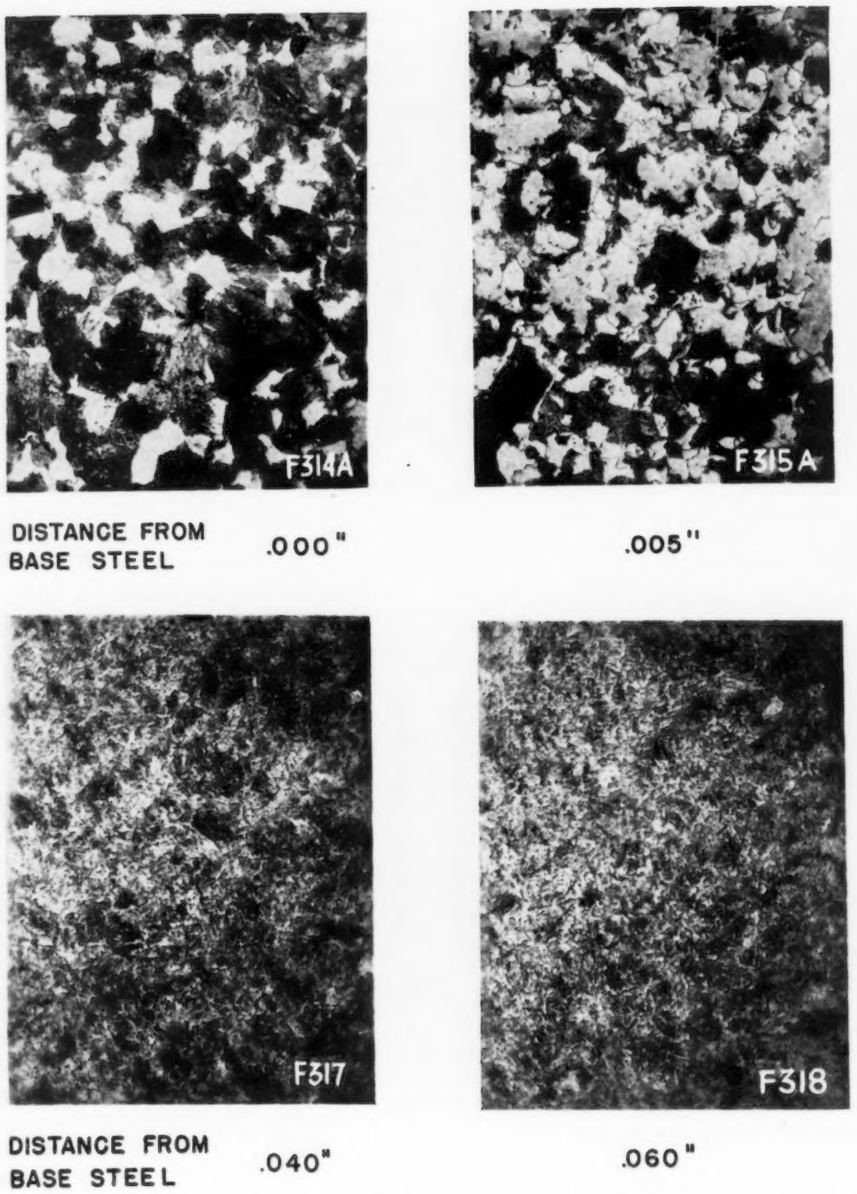
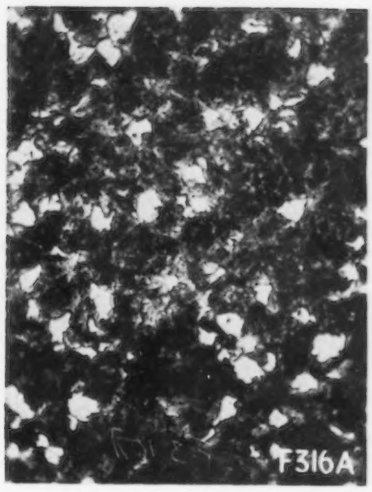
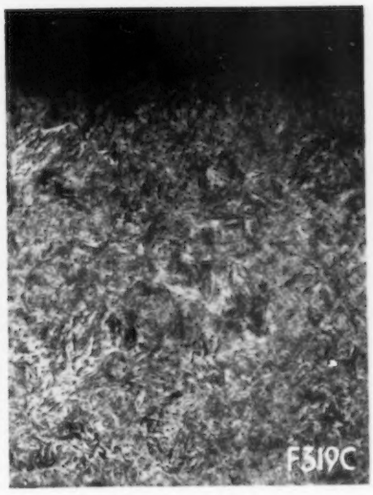


FIG. 21—Structure of a specimen of SAE 4145 ste lated in Fig. 20. At 500 dia

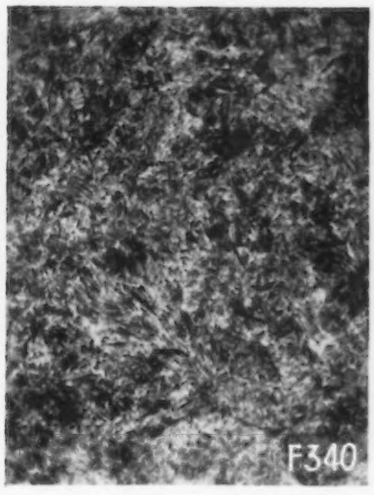
.005"



.020"



SURFACE



FURNACE HARDENED

el flame hardened in accordance with the data tabu-
meters; 2 per cent nital etch.

Bars of the type shown in Figs. 23 and 24 must necessarily be purchased with a rather large amount of stock to allow for the machining operation. The heavy cuts required to remove this stock set up appreciable machining strains which must be eliminated if a minimum amount of distortion is to occur in the carburizing and hardening operations. In view of the very great difficulty of straightening bars of this type, it was found necessary to relieve these strains when they were processed by the carburizing method. However, it is possible to eliminate this operation when the flame hardening process is employed. That is, three major operations can be taken from the production schedule, namely normalizing, sand blasting and finish planing. Of course, the finish planing cut is required when the bars are processed by the flame hardening method, but this is carried out in the same set up which is used to rough plane the bars.

When the bars were processed by the carburizing method it was necessary to carburize, sand blast and straighten after the finish planing operation. They were then returned to the machining department to have the carburized case machined off of any areas which required machining after the hardening operation. For example, in the case of the bar illustrated in Fig. 24, the area marked A would have to be machined after the bar had been carburized, because machining operations are required in this area after the bar is hardened.

Although in the particular instance of this bar, the entire end can be left soft and the flames are merely shut off when the torches reach the line B-B. The area A could have been protected by the use of a carbon block if it had been necessary to harden the entire end of the bars with the exception of the small area.

The items 7 and 8 as previously listed, namely sand blast after hardening and straighten after hardening, are eliminated when the flame hardening process is used because practically no distortion occurs, and the bars come from the flame hardening tank as shown in Fig. 23 with absolutely no scale.

It can be very readily appreciated that the elimination of eight operations of the nature of those briefly discussed will very appreciably reduce the cost and production time required to produce a finished part.

Due to the very heavy mass involved, the carburized bars usually had a maximum hardness of 56 to 60 Rockwell C and were frequently slightly softer. Whereas, as previously mentioned, the flame hardened bars had a uniform hardness of 60 to 62 Rockwell C. The carburized bars usually distorted as much as 0.040 in. or 0.050 in., whereas the flame hardened bars only distort about 0.003 in. to 0.010 in.

From the foregoing discussion it may be readily observed the flame hardening process has the following advantages:

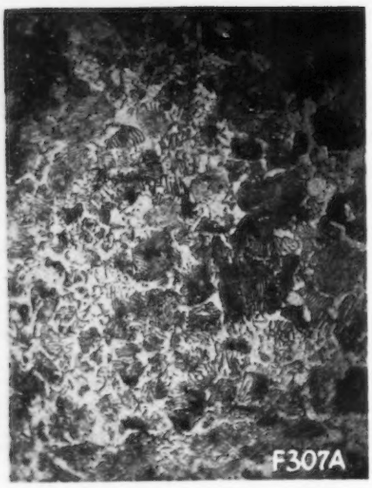
(1) Number of operations reduced 36 per cent.
(2) Material cost reduced $20 per ton.
(3) Distortion reduced 85 per cent.
  a—This appreciably reduces the amount of grinding stock required.
  b—Insures a uniform hard case.
(4) A slightly higher case hardness is obtained.

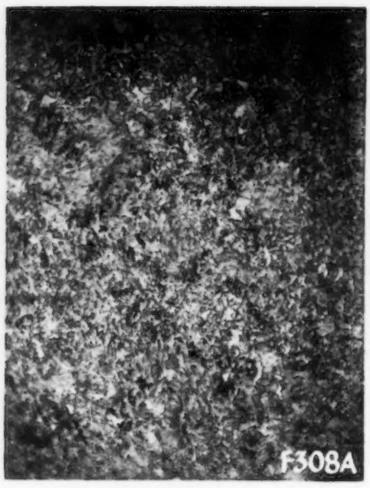
These factors combine to produce a very high quality part at a much lower cost.

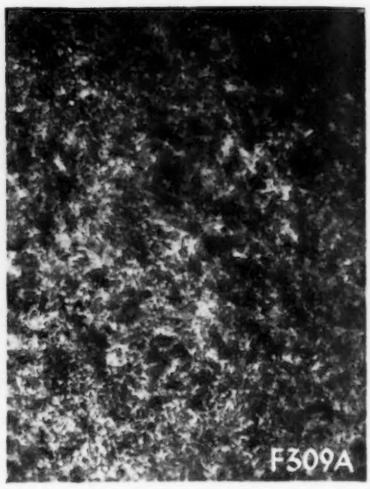
Although many other typical examples could be considered, such discussions would be unnecessary repetitions.

Flame Hardening of Gears

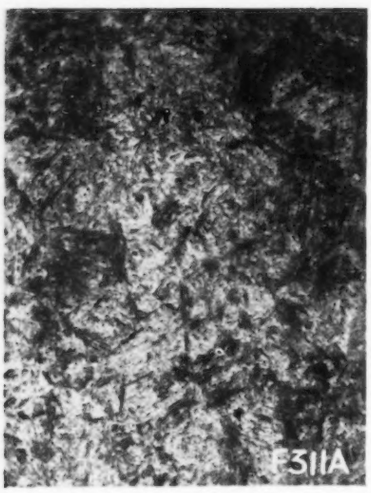
In this discussion the flame hardening of gears which have teeth within the range of 3 to 6 diametral pitch will be considered. In developing standardized operating conditions for hardening gears of this size range it has been found advantageous to make up pinions for test purposes and to conduct careful experiments which will develop the proper type of case

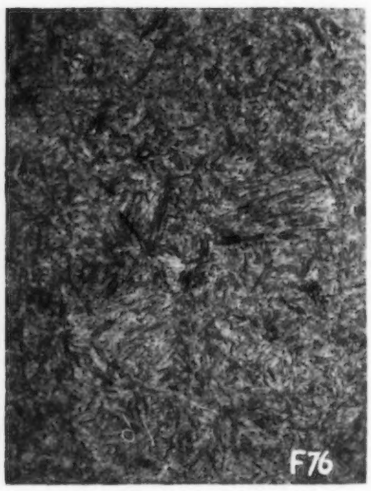






DISTANCE FROM BASE STEEL .000" .020" .040"





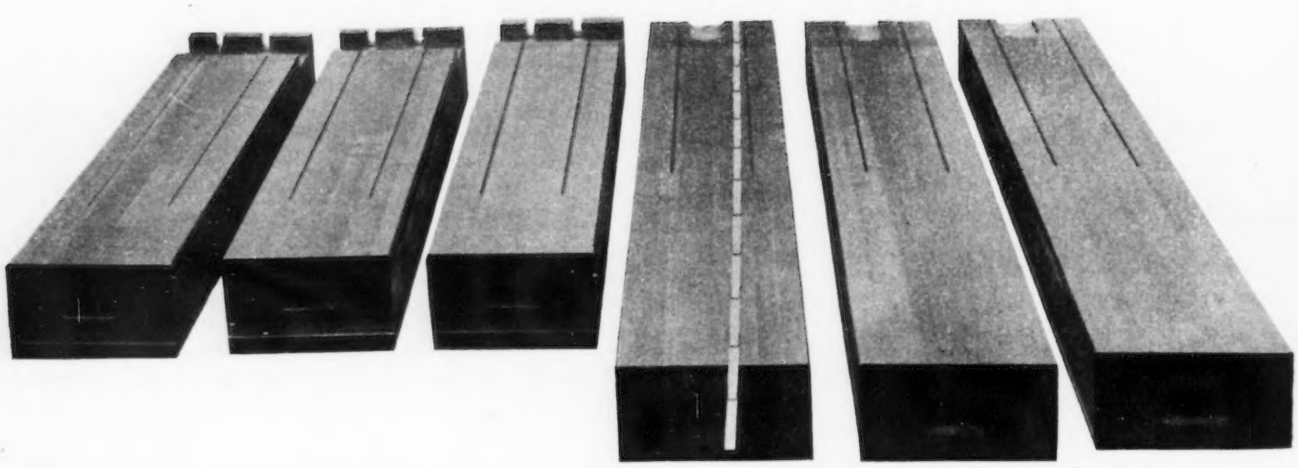
SURFACE FURNACE HARDENED

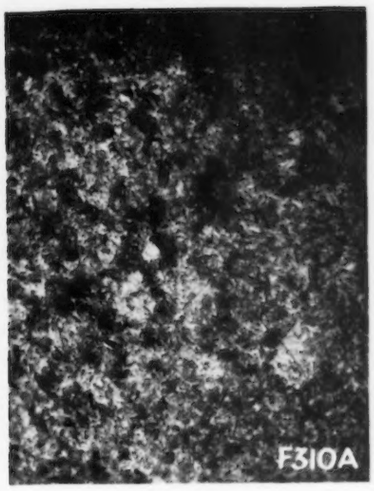
FIG. 22 — Structure of SAE 3140 steel flame hardened in accordance with the data shown in Fig. 20. At 500 diameters; 2 per cent nital etch.

° ° °

BELOW

FIG. 23—This large part is regularly flame hardened on a production basis.





.060"

and microstructures. In view of the fact that Le Blond has developed special flame hardening tips for plant applications, it will not be possible to list tabular data showing standardized operating conditions. However, these conditions have been carefully established so that case depths as shown in Fig. 25 can be readily reproduced. The photograph shown in Fig. 26 is a typical set up for hardening gears of this type. The torches used are Airco No. 9803. They are regular welding torches equipped with 10-12 mixers and special water cooled gear hardening tips. The inset photograph shows the quenching side and the fin which prevents the quenching medium from interfering with the flames. A special tip of this type can be designed to suit any desired gear tooth profile in the size range referred to. It is very easily adjusted in position and provides an economical set-up which gives results that can be accurately reproduced. As may be observed from this photograph, two torches are used on each gear and two gears are set on a mandrel in a manner similar to that usually employed in cutting gears of this type.

To obtain proper case depth at the starting end of the teeth it is necessary to preheat the ends by dwelling a few seconds after the tips are lighted before the lineal motion is started. The adjustment of this factor will produce any desired end condition. If the period of dwell is adjusted so that a normal case depth is produced, a deeper or shallower case may be obtained by increasing or decreasing the period.

The case depth on the shut-off end can also be accurately controlled. It is a well known fact that heat applied to a localized section of metal will be conducted away from the point of application. This fact would cause the finish ends of flame hardened teeth to be overheated if the flames are not extinguished before the extreme end is reached. By varying the distance from the ends to the point where the flames are extinguished the case depth on the shut-off end can be accurately controlled.

To obtain full hardness on the shut-off end of the teeth it is necessary to quench the entire end immediately after the flames are extinguished. As illustrated in Fig. 26, this can be accomplished by placing two pipes in the positions as shown.

In flame hardening gears of this type the practice of indexing approximately one quarter turn was used in preference to hardening consecutive teeth. This procedure permitted flushing the section of the gear surrounding the previously hardened teeth while the next pair is being treated. This keeps the entire body of the gear cool without unnecessary time loss. Gears hardened in accordance with this procedure have a negligible amount of distortion.

In the early experimental stages the gear, as shown in Fig. 26, was flame hardened with a single torch and one part at a time. As more jobs were routed to the flame hardening machine, it became necessary to increase the efficiency of the operation. A brief analysis of the parts involved showed that by making the hubs of the gears so that the rims could be set together as shown, two parts could be placed on the mandrel. This permitted the torch to travel across the width of two gears and thus reduced the dwell and end quenching time 50 per cent. The use of two flame hardening tips in place of one further reduced the hardening time and in the final anaylsis the original time required to harden these parts was reduced 60 per cent, thus making a much more economical operation.

FIG. 24—The torches are grouped as shown here and the large part is flame hardened in one pass.

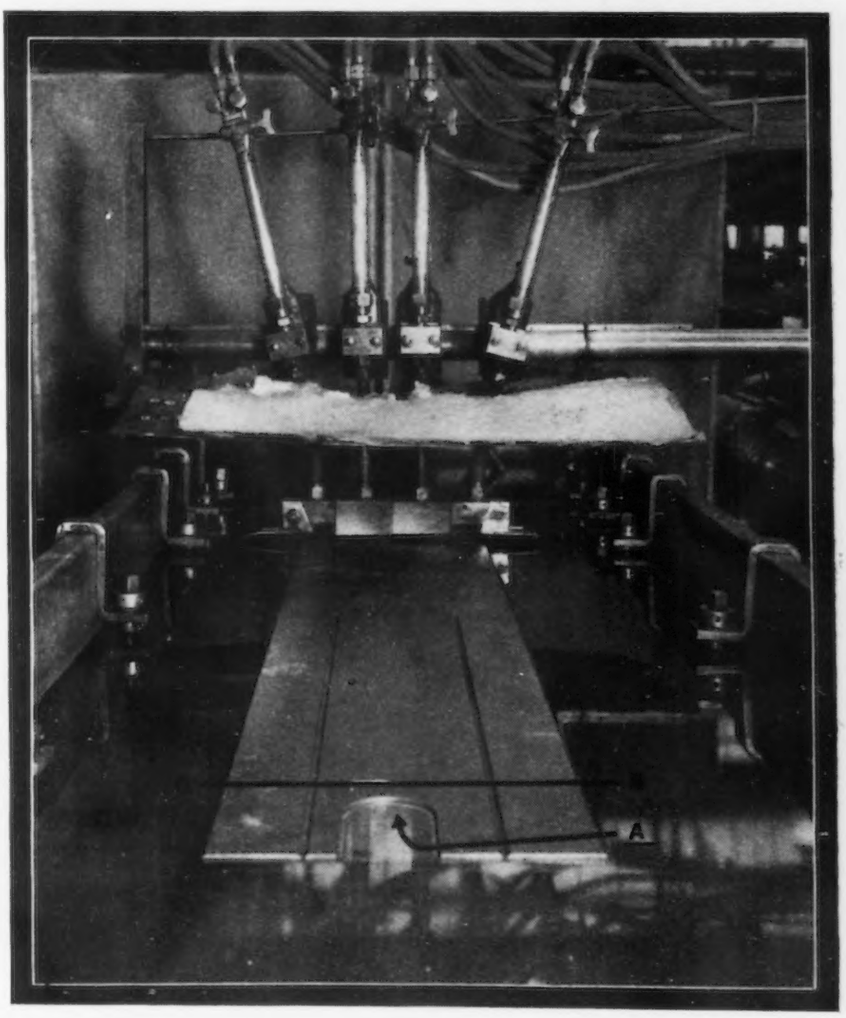
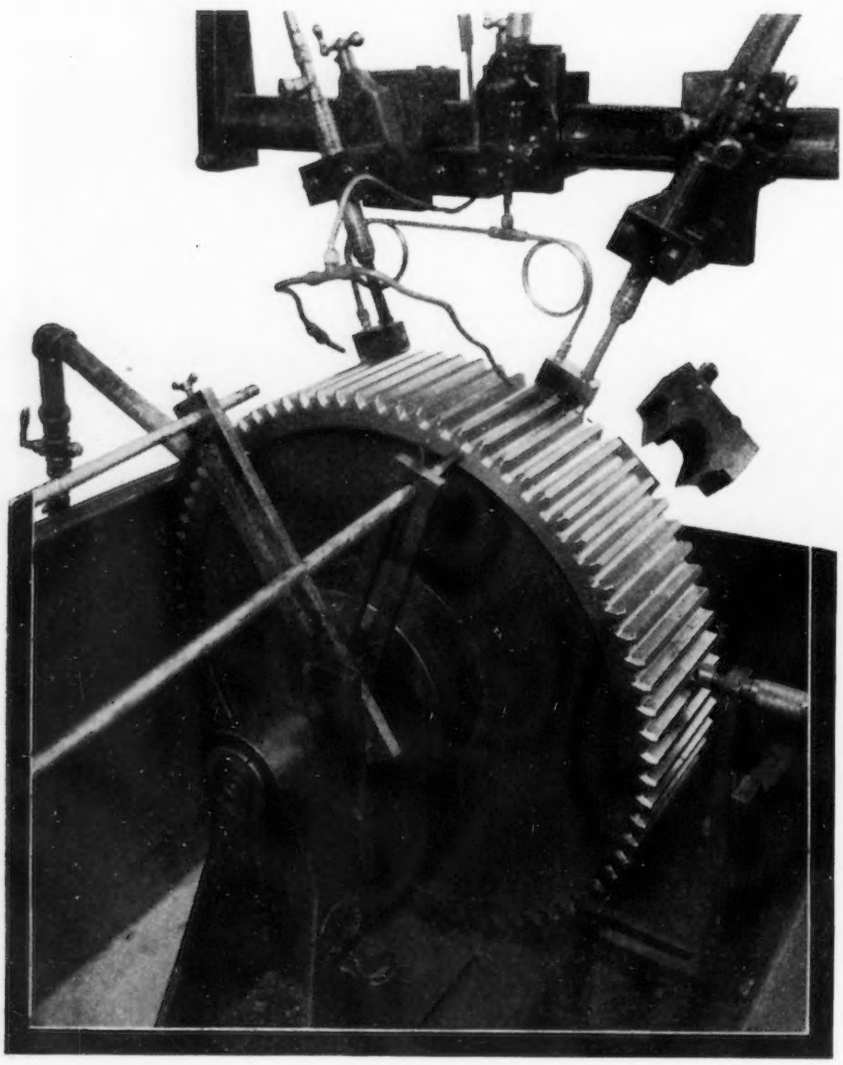


FIG. 25—Operating conditions have been so standardized that case depths on teeth, as shown here, can be readily reproduced.

o o o

FIG. 26—To obtain full hardness on the shut-off end of the teeth it is necessary to quench the entire end immediately after the flames are extinguished.



Almost all large gears hardened in the LeBlond plant are set up in a manner similar to that shown in Fig. 26, thus greatly increasing the production capacity of the flame hardening department.

The photograph shown in Fig. 27 illustrates the method by which an internal gear may be hardened by the progressive flame hardening method. In hardening a part of this type an Airco 9803 torch is used equipped with a 10-12 mixer and a special extension made up from copper tubing with a steel tubing case. In hardening a gear of this type a constant stream of coolant is applied to the outside diameter, as may be observed. This coolant is applied to prevent reflected heat from causing an out-of-round condition on the thin rim. Gears of this type are regularly hardened on a production basis and no difficulty is encountered from distortion. However, it can be readily appreciated that any other hardening method would cause a very appreciable amount of distortion and would in all probability make the gear practically useless for machine tool application.

In standardizing operating conditions for gears of the types illustrated the procedure has been established in such a manner that uniform martensitic structures and wide transition zones are produced.

Flame Hardening by Spinning

Flame hardening of cylindrical parts such as small pitch gears, positive tooth clutches and short lengths of shafts is accomplished by setting the torches stationary and rotating the work. In flame hardening small pitch gears, from one to six or more torches may be grouped around the circumference of the gear and it is rotated at a suitable rate of speed. Standardized operating conditions for this type of part can be established by hardening sample parts and carefully examining the structures and depth of penetration produced. Although numerous gears have been hardened in this manner, it is not felt that the data are sufficiently standardized to warrant publication at this time. However, it has been definitely established that uniform results can be readily reproduced and fine martensitic structures, identical to those shown in Figs. 21 and 22, extend from the transition zone to the tip of the teeth.

The positive tooth clutch, as shown in Fig. 28, is of such design that it is only necessary to harden the teeth, and it is essential that the hub be soft so

that a taper pin hole may be drilled in assembly. Prior to the introduction of flame hardening there were two methods by which such a part could be produced.

The part could be made from an oil hardening steel such as SAE 3140 or SAE 4140 and hardened by submerging the teeth in a lead pot. However, this method is very difficult to control in parts having sections as shown in this sketch. There is a tendency for the heat to be conducted into the hub to such an extent that hard spots are produced. The second disadvantage to this method is the fact that there is a very definite tendency to cause hole distortion, and it is always necessary to add an operation for grinding these holes after heat treating.

The other method by which a part of this kind could be manufactured would be to use a low carbon steel such as SAE X-1314 or SAE 3115 and either copper plate or allow stock in both the bore and on the outside diameter of the hub; carburize, then remove the excess stock or copper plate and proceed with the hardening. It may readily be seen that either of these methods require several extra machining operations and very appreciably increase the cost.

The use of flame hardening permits the part to be processed complete with the exception of heat treating then be set up as shown in the sketch Fig. 28 and hardened. Clutch teeth of this type can be hardened to the base of the tooth without hardening the hole or causing more than 0.0005 in. to 0.001 in. change in its size. They can be processed at a rate of approximately 120 per hr., and as can be readily appreciated this is much faster and more economical than either of the other methods described.

The flame hardening of long cylindrical parts by the spinning method must be accomplished by moving the torch along the work as it is revolved. An example of a typical set up of this type is shown in Fig. 29. In this illustration a 0.300 in. pitch Acme screw with 34 in. of thread is being hardened by the progressive spinning method. In this set-up the screw is rigidly supported by a heavy follow-rest which is set immediately back of a special circular quenching head. The inset on this photograph shows the depth of penetration produced when a screw is hardened in this manner, and the photomicrographs shown in Fig. 30 illustrates the type of microstructure produced. From these photomicrographs it can be readily noted that the transi-

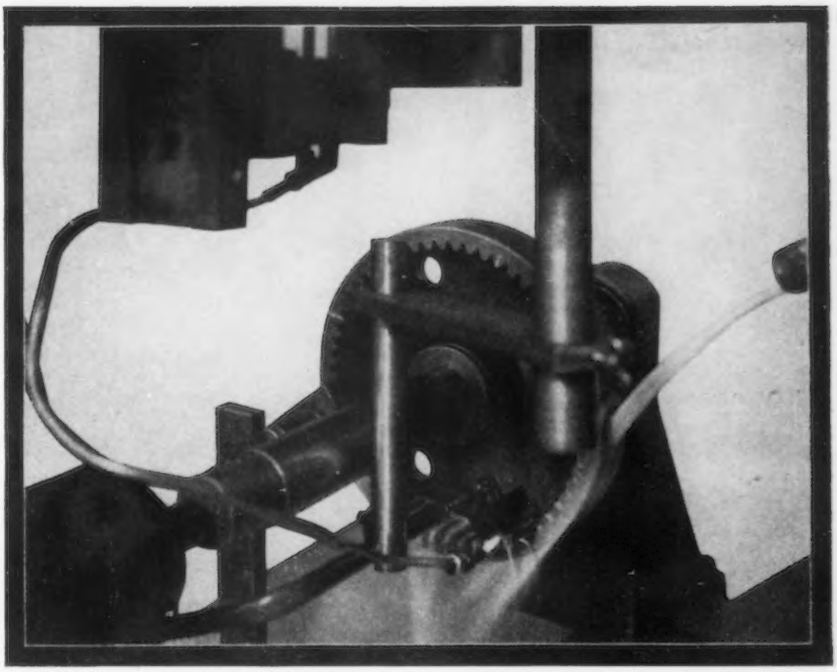


FIG. 27—An internal gear may be hardened by the progressive flame hardening method in this manner.

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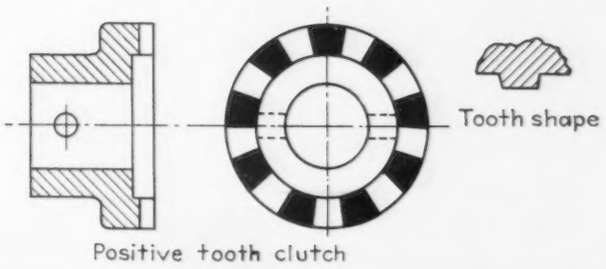
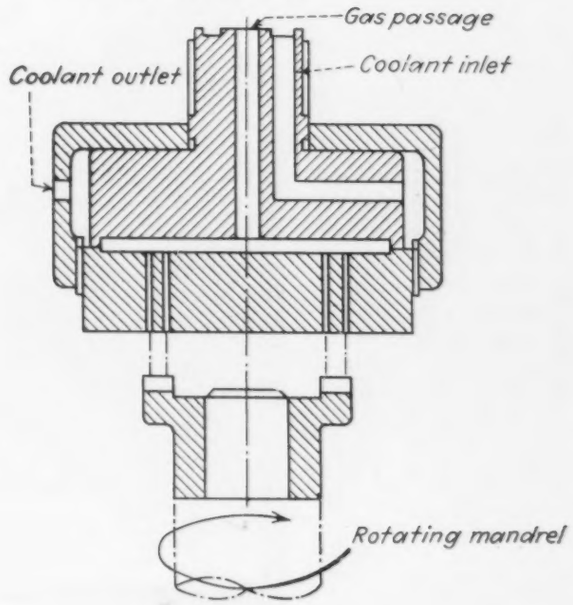


Positive tooth clutch

FIG. 28—This positive tooth clutch is of such a design that it is only necessary to harden the teeth. This is done by the flame hardening method. A special circular tip is used, as shown (next week) in Fig. 34-E.



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DISTANCE FROM BASE STEEL .000" .015" .030"

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FIG. 30—Type of microstructure produced in the flame hardening of a long cylindrical part by the spinning method. At 500 diameters; 2 per cent nital etch.

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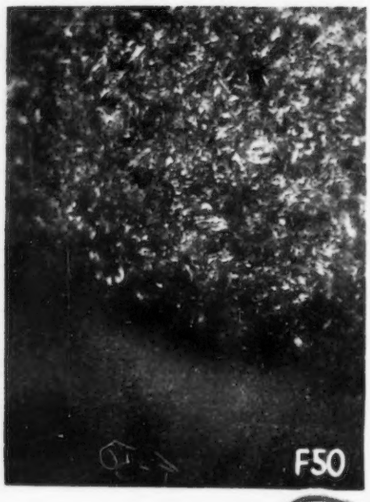

DISTANCE FROM BASE STEEL .065"

SURFACE

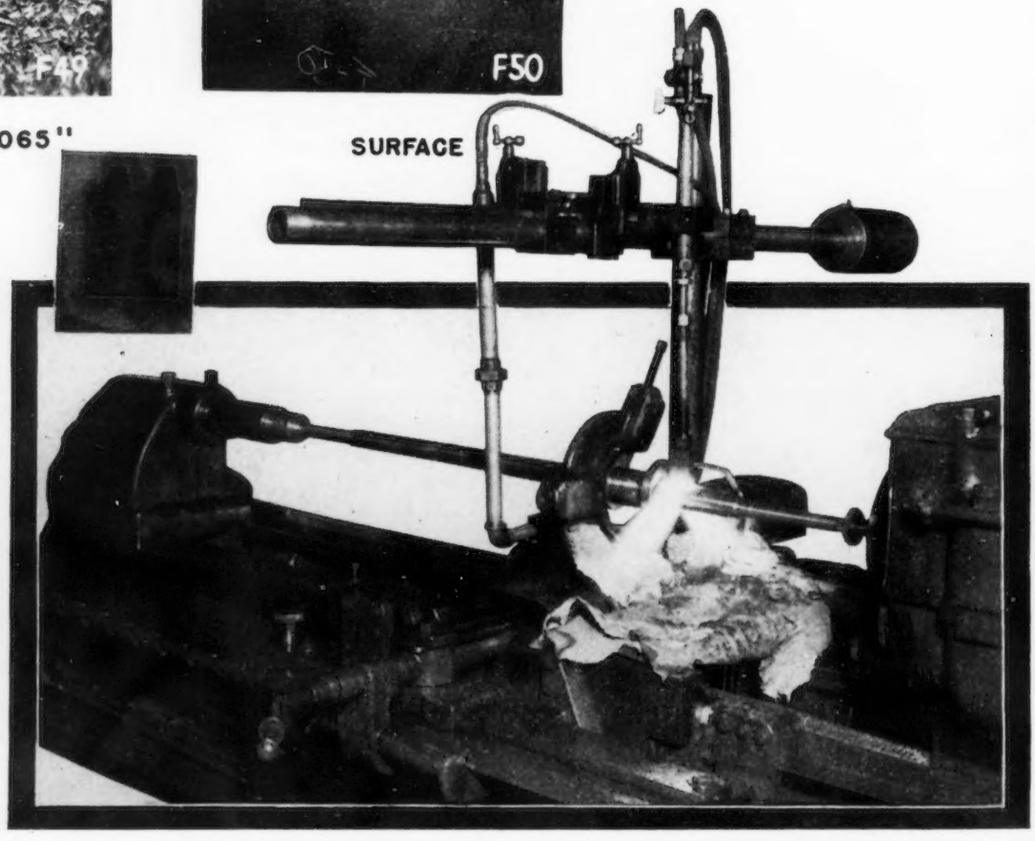

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FIG. 29—This is an excellent example of the flame hardening of long cylindrical parts by the spinning method. Insert shows depth of penetration of hardening.

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.045"

TABLE IX

Variation in Hardness Between the Base Metal and the Surface of Flame Hardened SAE 4145 Steel

Base Steel	Scleroscope Hardness												
	Distance from Base Metal, In.												
	0.005	0.010	0.020	0.030	0.040	0.050	0.060	0.070	0.080	0.090	0.100	0.120	0.125
28	28 to 40	42	50	65	71	74	77	75	76	77	79	82	85*

* Hardened surface.

tion zone is approximately 0.050 in., and that a uniform fine martensitic structure extended from the transition zone to the tip of the tooth. After the flame hardening, screws of this size usually develop a run out of about 0.004 in. which can be removed by a straightening operation.

Experimental work can be conducted which will establish the amount of stretch per thread caused by flame hardening. For example, the screw illustrated stretches 0.00035 in. per thread. Although this is too great an inaccuracy for a precision screw, it can be eliminated by cutting the thread to a corrected pitch of 0.29965 in. When the threads are cut to these dimensions the final error will not be in excess of 0.00002 in. to 0.00005 in.

Ed. Note: — Next week the author concludes this extensive and timely investigation.

P-M-G Metal Used in Naval Construction

AS a result of the shortage of tin in World War I, the desirability of light and strong metal for casting, and the persistence of a young Scotch engineer, a new metal hardener was developed, which today plays an important part in national defense. It likewise has provided industry in general with a valuable element applicable to many phases of metal fabrication for countless domestic products.

A combination of silicon, copper and iron alloyed together, produced a metal known as P-M-G, and its manufacture in the United States and Canada is controlled by the Phelps Dodge Copper Products Corp., with the Canadian license being held by the Canadian Bronze Co. The metal is of lower specific gravity than the conventional tin bronzes, and of greater strength, has greater resistance to fatigue and shock and is said to be particularly adaptable to conditions where sea water corrosion or the effect of elements is a factor. Because of this it is said to be highly valuable in naval construction.

It is said that this substitute for tin in the fabrication of many articles that go to make up the modern naval vessel will alleviate considerably the present concern over the tin shortage, in the manufacture of the articles in which it replaces that metal. In the construction of each of the two palatial liners, Monarch of Bermuda and the sister ship Queen of Bermuda, virtually all the bronze castings were of P-M-G metal, and a far greater amount goes into the average Navy dreadnaught, where the new hardener can effect a large reduction in the weight of castings, shafting, shell hoists, torpedo tubes, and miscellaneous tubing and other metal parts of the vessels.

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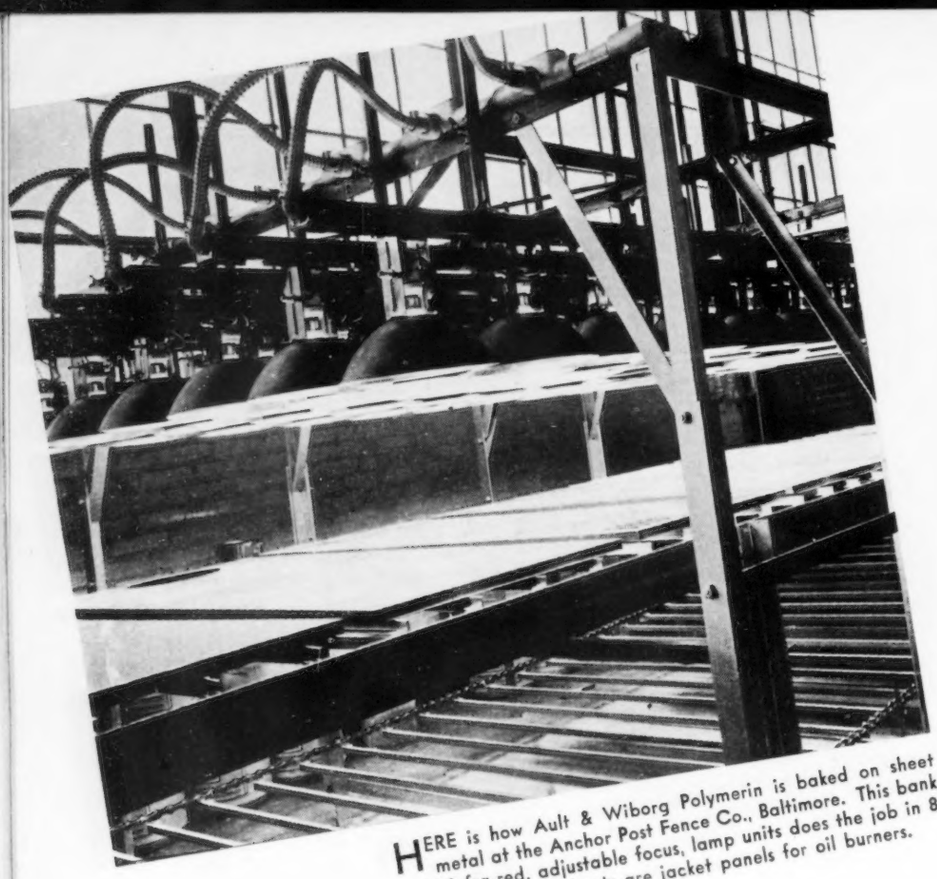
Infra-Red Finishing of Burner Parts



HERE is how Ault & Wiborg Polymerin is baked on sheet metal at the Anchor Post Fence Co., Baltimore. This bank of 72 infra-red, adjustable focus, lamp units does the job in 8 min. The steel sheets are jacket panels for oil burners.

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AN interesting application of an infra-red finishing system is found at the Anchor Post Fence Co., Baltimore, where both completed oil burner units and large jacket panels are now baked out under lamps. Anchor Post Fence Division manufactures the "Fluid Heat" oil burner, in addition to its extensive line of steel fence sections.

Jacket panels for the heaters are constructed of 20 gage steel. The operator in the spray booth applies a priming coat on the under side of the panel and a coat of Polymerin on the upper side. Polymerin is a low-bake finish made by Ault & Wiborg. It is processed by polymerization, or change to a higher molecular weight without changing the relative proportions of the elements present. On top of the Polymerin is sprayed a hammered effect vehicle known as Polymeroid, the heat resistance of which makes it especially adaptable for boiler jackets and all types of heating appliances such as oil burners. The panel is then ready for baking.

With infra-red drying lamps, illustrated, this baking operation takes only 8 min., the primer on the under side and the Polymeroid being baked simultaneously. The conveyor carrying the sheets moves at the rate of 1 ft. per min., a speed timed to the spraying output. When the sheets reach the unloading end, they are cool enough to handle.

The oil burners themselves are finished with a Polymeroid finish in very much the same way. The baking cycle in this case is 16 min. The equipment required occupies a space 30 ft. long and 5 ft. wide.

No preheating is necessary. Full application of heat follows the instant the lamps are turned on. Cost of operating the oven is estimated at 20c. an hr. The resultant finish on the oil burner panels and on the oil burners is reported to be tough, durable and uniform.

COMPLETE oil burner units, finished with short-cycle, low-bake Polymerin, are baked in 16 min. under this bank of 72 infra-red lamps. The steel slats are part of the conveyor system.

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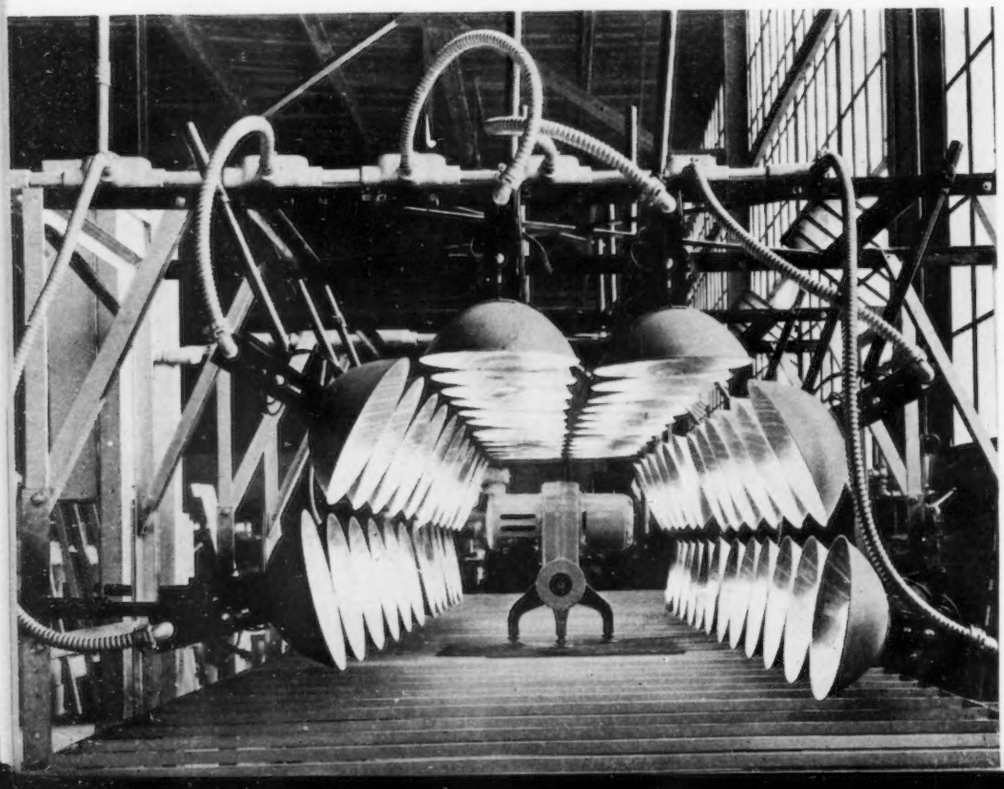


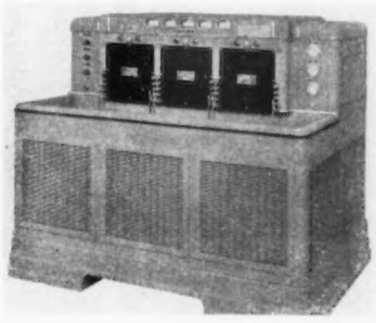
New Equipment . . .

Heat treatment and process control:

Latest developments in surface hardening units, tempering, drawing, annealing and forging furnaces, an aluminum rivet heater, new pyrometers, temperature and pressure recorders and controllers, an annealing box lifter and improved insulations are described in this article.

o o o

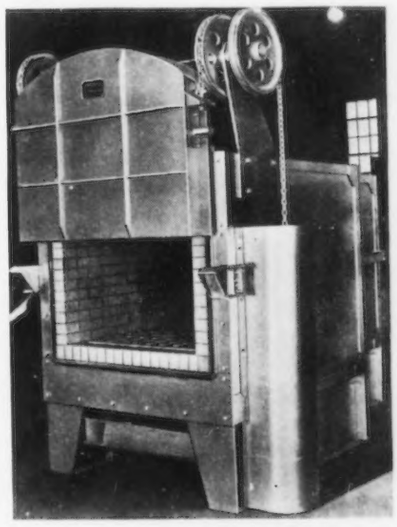
DESIGNED to offer small parts manufacturers the advantages of low cost surface hardening by electrical induction, the new Tocco Jr., type MG 10, developed by *Ohio Crankshaft Co.*, 6600 Clement Avenue, Cleveland, is available in five sizes ranging from 10 to 80 kw output. These



units are completely self-contained, are built with 1 to 3 hardening stations and can be adapted to brazing, soldering and heating for forming by simply disconnecting the quench water. The new units follow closely the design of the larger Tocco machines, except that all parts are now in a single enclosure. A built-in motor generator set supplies high frequency current of 9600 cycles to the inductor block. Notable features of the new Junior line are increased power and a broader range of hardening, pre-set full automatic timing controls, specially designed water cooled transformers and easily changed fixtures. Claimed advantages of the Tocco method of hardening are that each part can be locally hardened at the wearing surface only and that parts come from the inductor free of dirt, scale, decarburization and distortion.

Box Type Tempering Furnace

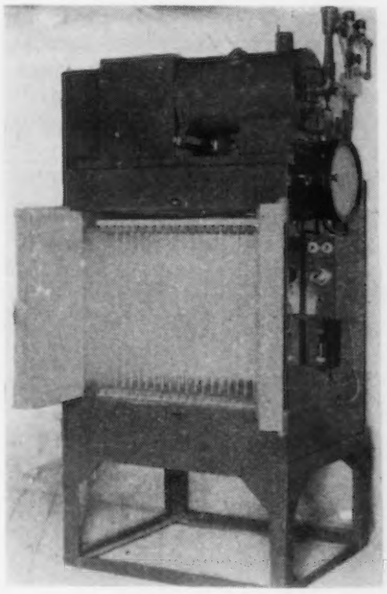
UTILIZING the Cyclone forced convection heating principle, by which large volumes of accurately heated air are driven through the work under pressure and at velocities of around 2 miles a min., the new production box type tempering furnaces announced by *Lindberg Engineering Co.*, 221 North Laflin Street, Chicago, are especially suited to heating large or bulky parts such as aluminum castings, aircraft sub-assemblies, forgings,



large gears and other ferrous parts. Available in five standard sizes, this new furnace features heating elements which can be easily and quickly removed without cooling the furnace or disturbing the charge. Standard temperatures are 200 to 850 deg. F. and 200 to 1250 deg. F. The convection method of heating gives very rapid heating and assures that all parts of the charge will be heated to the same temperature.

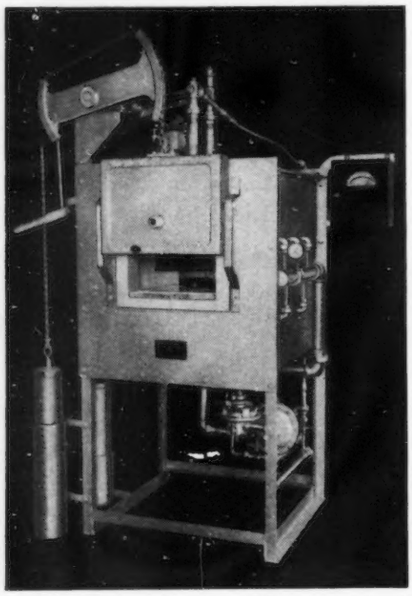
Tempering and Drawing Furnace

FEATURING controlled combustion external air heaters, the new line of tempering and drawing furnaces announced by *Despatch Oven Co.*, Minneapolis, are said to be unusually economical in operation. The accompanying illustration shows one of these furnaces adapted to tempering and drawing band saw blades which are wrapped in coils and rolled into the furnace in an upright position. Furnaces are available for temperatures up to 1250 deg. F., in numerous sizes. Uniformity within ± 3 to 5 deg. can be obtained along with very rapid heat transfer. High capacity fans force the heated air into ducts at the bottom of the furnace. The air then moves vertically through the furnace to the recirculation ducts at the top of the unit. Horizontal air flow can also be arranged.



Oven Type Furnace with Bell

TO meet the demand for a furnace for heat treatment under definite temperature control on a small scale, *American Gas Furnace Co.*, Elizabeth, N. J., has developed a new oven type



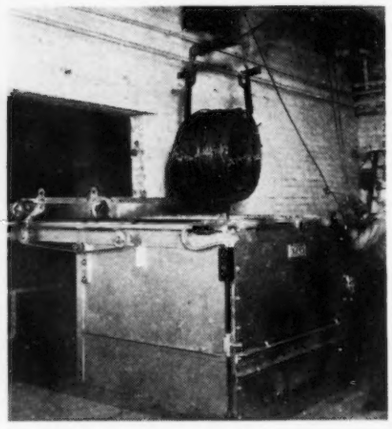
furnace provided with a bell of heat resisting alloy which closes down on work during treatment. The bell can be quickly and easily raised by the door lifting mechanism and does not delay or inconvenience the operator. The thermocouple is inserted through the top of the bell and is close to the work. The atmosphere gas is introduced through a second inlet in the bell and escapes through a sand seal on which the bell rests and is combusted in the furnace. Uniformity is claimed due to bell being totally enclosed and heated by burners firing both above and below from the sides. Carburizing, nitriding, ni-carbing, clean hardening, bright annealing and brazing can also be done in this furnace.

Pot Furnaces

TWO new gas fired pot furnaces for case hardening, tempering, perlitonizing and melting non-ferrous metals are announced by *Johnson Gas Appliance Co.*, Cedar Rapids, Iowa. Both furnaces are designed for salt, cyanide or lead hardening and are especially suitable for use in small shops. Tool, die, pattern and model makers will also find wide use for these furnaces. The larger furnace has a pot 8 in. in diameter and 10 in. deep. *Johnson Gas Appliance Co.* has also developed a new housing for its No. 550 pot hardening and melting furnace. The new furnace standard is built to the floor, instead of standing on legs, making it more stable.

Wire Annealing Furnace

THE Ajax-Hultgren heating principle, whereby heat is generated directly in a liquid salt bath by means of immersed electrodes without the use of heating elements, is now being applied commercially to annealing wire in coils, according to *Ajax Electric Co.*, Frankford Avenue and Allen Street, Philadelphia. Furnace illustrated herewith is used in annealing high carbon SAE 52100 wire and has an output of 1500 lb. per hr. A charge of 750 lb. is placed in the bath at 1275 deg. F. and is brought to temperature within 15 min. Working range of



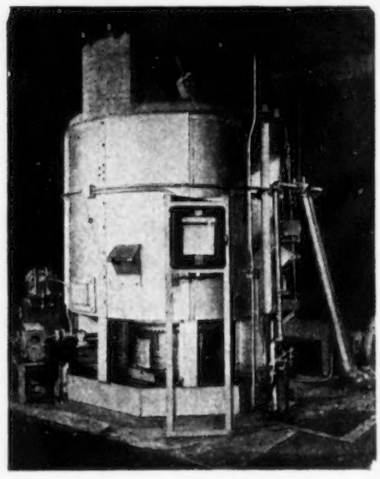
furnace is from 1150 to 1500 deg. F. Temperature uniformity of within 5 deg. F. can be obtained throughout the charge.

Aluminum Rivet Heater

CAPABLE of heating 24 aluminum rivets to 400 deg. F. in 3 min., or to 950 deg. F. in 4 min., the Berwick electric aluminum rivet heater developed by *American Car & Foundry Co.*, 30 Church Street, New York, is equipped with fully automatic temperature control making it possible to obtain any desired temperature between 0 and 1000 deg. F. The heaters have 12 slots on each side, making it possible to heat 24 rivets at a time. Rivets from ⅛ to 1⅛ in. in diameter and up to 4 in. in length can be handled. Heater is rated at 16 kva. and has two ranges of heating speed—a high speed to bring the unit to temperature and a slow speed for maintaining the temperature. The control mechanism maintains the temperature within ± 5 deg. Heater can be used for annealing rivets, or for heating them to drive hot. It is also possible to use the unit for heating aluminum rods for making rivet or bolt heads, or for forging. Heat is generated by a number of 430-watt units.

Center Fire Rotary Furnace

A NEW center fired rotary forging and heat treating furnace, featuring a single burner located at the bottom of the hearth and firing up through a long combustion cone of special design, is offered by *Mahr Mfg. Co.*, Minneapolis. This method of firing is said to assure that the products of combustion come into equilibrium



with themselves prior to coming in contact with the steel, thereby minimizing scale and decarburization. Furnace is said to be free of cold spots and is manufactured wth hearth diameters ranging from 4 to 9 ft., for either gas or oil firing, and for temperature ranges from 1400 to 2500 deg. F. The rotary table is gear driven from a variable speed reducer. Furnace is equipped with a new type of sand seal having filling chambers for maintaining sand seal depth.

Portable Pyrometer

FUNDAMENTALLY new in design is the portable potentiometer pyrometer for measurement of temperatures by thermocouples introduced by *J-B-T Instruments, Inc.*, 441 Chapel Street, New Haven, Conn. Designated as model 70-PO, instrument can be used for testing permanently installed

temperature measuring and controlling equipment as well as for general industrial and laboratory use. It also finds application in reading temperatures of moving vehicles. Outstanding advantages of this design are light weight, ability to withstand vibration and adverse conditions of ambient temperature, an accuracy of 0.5 per cent total scale deflection and a special Triplett microammeter with automatic cold junction compensation inside the case. Unit operates on a flashlight cell and is independent of thermocouple resistance, within large limits, permitting use of small thermocouples where other temperature sensitive elements would be too slow, too large or too fragile. With scales of 0 to 400 deg., once balanced and adjusted, the pyrometer requires no further balancing operations, but is thereafter read as a deflection instrument. On scales below 0 to 400 deg., one balancing operation is needed for each temperature reading.

High Frequency Capacitors

A NEW line of water-cooled Inerteen capacitors for high frequency service on induction furnaces and similar applications is being marketed by *Westinghouse Electric & Mfg. Co.* Capacitor sections are made by winding a special grade of paper with thin copper foil. Foils are bonded on one end to the water tube so that they conduct heat to the water and carry the current. Leads are brought out at the center and ground terminals of each group of sections are near the ends of the case. The complete unit is vacuum dried and impregnated and filled with capacitor Inerteen, a non-inflammable fluid; in combination with the capacitor paper used it is especially suited also as a dielectric for high-frequency applications.

Interval Timer

DESIGNED for use with heat treating furnaces and other applications in which timers may be subjected to excessive moisture and dust conditions, the new model D2 interval timer marketed by *R. W. Cramer Co., Inc.*, Centerbrook, Conn., is enclosed in a dust tight, splash proof cast aluminum housing arranged for conduit connection and provided with a full vision window and external setting knob. It is powered by a standard self-starting synchronous motor and is available in 12 scales ranging from one revolution in 15 sec. to one revolution in 24 hr. Dial is 3 in. in diameter.

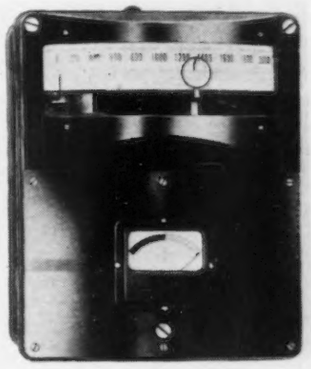
Pressure Controller

FLEXIBILITY of installation, convenience of operation and ease of adjustment are stressed in a completely redesigned industrial furnace pressure controller announced by *Leeds & Northrup Co.*, 4934 Stenton Avenue, Philadelphia. Mechanism is housed in a rigid, die-cast case. Al-

though designed primarily for flush-mounting, it can be supplied for surface mounting. Built into the controller door is a selector switch and a pushbutton station. An integral part of the instrument, these space-saving accessories enable the operator to take over on manual control at a moment's notice. Also located at outside of door is a handy control setting knob. Through a window, just below it, can be seen a stationary pointer and a movable dial. Dial is calibrated from —0.05 to +0.15 in. of water. Adjustments are facilitated by two sets of convenient weights. One set adjusts the zero setting of the instrument's mechanical balance; the second adjusts its sensitivity.

Pyrometer Controller

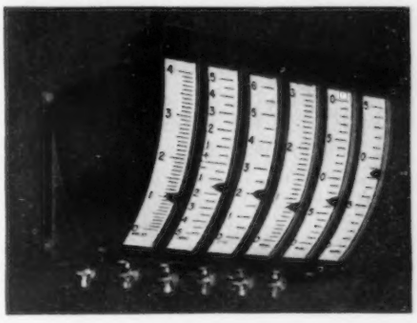
MOVING parts in the control circuit, such as motors, depressor bars, etc., are completely eliminated in a new electronic pyrometer controller developed by *Bristol Co.*, Waterbury, Conn. The pointer of the millivoltmeter movement is not engaged or retarded at any point within its normal operating range, being free



to continuously indicate the temperature under control. Control is accomplished by means of a new electronic circuit, using a single high output all-metal vacuum tube. A milliammeter on the front of the instrument indicates the condition of the control circuit at all times. The entire operating mechanism of the Millivac relay is enclosed in a vacuum.

Multi-Point Indicator

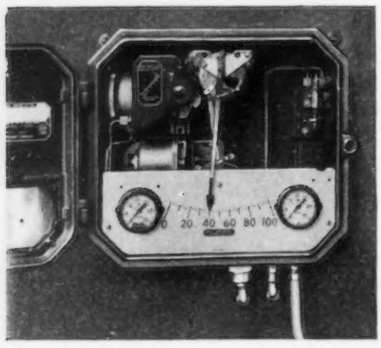
FOR indicating drafts, pressures, differentials and other factors in industrial furnace and boiler operation, a new multi-point indicator has been placed on the market by *Republic Flow Meters Co.*, 2240 Diversey Parkway, Chicago. Zero adjustments and all piping connections for each gage unit are accessible from the front of the panel and each unit can be withdrawn without disturbing the other units. Each gage is actuated by a dry bellows type diaphragm for ranges from 0 to 50 in. of water or by a helical element for pressures above 50



in. The indicator is supplied with from 2 to 16 of these interchangeable gage units and is built for either flush or projected mounting. Scales are illuminated from the rear.

Remote Control Systems

SIMPLE, accurate and economical means of indicating, recording or controlling process variables at places remote from the point of measurement is offered by the new remote pneu-



matic transmission system developed by *Taylor Instrument Companies*, Rochester, N. Y. This system is particularly advantageous where it is desired to correlate temperature, pressure, flow or liquid level data on a centralized panel. Standard Taylor instruments are utilized and a system may consist of one or two transmitters connected to a receiver, or one or more receiving instruments as much as 1000 ft. from the transmitter. The transmitting medium is air pressure carried in ¼ in. copper tubing. Accuracy of this method is said to be within ± 1 per cent of the scale range. The entire system is independent of electrical circuits.

Refractory Walls

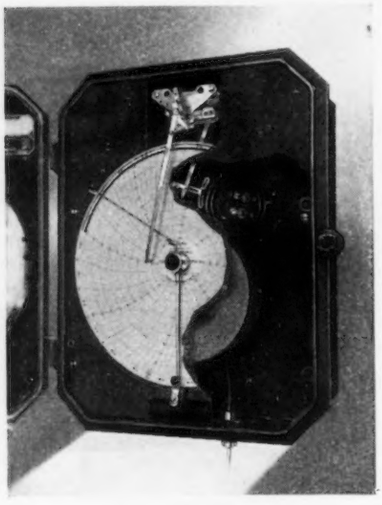
FURNACE and boiler walls so designed that insulation can be placed between the refractory material and the horizontal box castings, permitting 90 per cent of the wall supporting metal to be outside the insulation, have been developed by *Geo. P. Reintjes Co.*, 2517 Jefferson Street, Kansas City, Mo. In this design all metal within the insulation consists of individual pieces of limited size, making cumulative growth impossible. A cooling space is formed by attaching expanded metal lath and insulation to the outside of the box supporting castings. The design permits the metal to be vented to further cool the castings without use of a metal casing.

Block and Pipe Insulation

A NEW 1500-deg. insulating material, called L-W Superex, has been introduced by *Johns-Manville, 22* East 40th Street, New York. Furnished in both block and pipe covering form, this material is said to represent a marked improvement in conductivity and strength for an insulation in the service temperature range above 600 deg. F. This new insulation is of the molded diatomaceous silica type, and weighs only 20 lb. per cu. ft.

Recorders

TO provide a companion recording instrument for their line of Fulscope controllers, *Taylor Instrument Companies*, Rochester, N. Y., have developed new recorders for temperature, humidity, pressure, load, rate of flow, liquid level and receivers for pneumatic transmission systems. The



new universal case is for both flush and face mounting. Time previously needed to change charts is cut in half by a new mechanism combining a chart locking device and pen lifter. Instruments can be had with 10 or 12 in. charts and with 1, 2 or 3 pens. Other features include an electric chart clock with improved coil design, totally enclosed oil immersed gears and a slower speed motor.

Flame Failure Protection

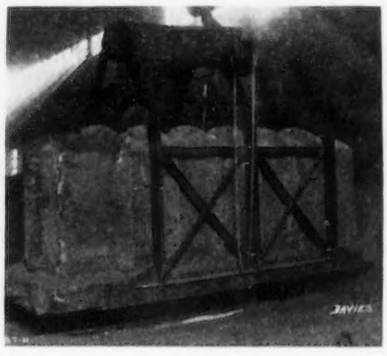
PROTECTION against failure of oil, powdered coal or luminous gas flames is provided by the Protectoglo, Photo-Electrode system newly developed by *Brown Instrument Co. Division, Minneapolis-Honeywell Regulator Co.*, Philadelphia. Function and operation of this system is quite similar to the Brown Flame-Electrode Protectoglo system, the principal difference being in its method of flame detection. The presence of a flame is detected in the new unit by means of light emitted when burner is in normal operation. This light falls on a light sensitive device which causes a current to pass through a vacuum tube circuit and a relay, energizing the main fuel valve. Response of the unit to flames of different luminosity may be changed on the job through a simple adjustment. A time lag is incorporated to prevent transient flame disturbances from causing unnecessary shutdowns. It is claimed that use of this system increases safety factor in operation of fuels giving luminous flames as it is a direct method of safeguarding against explosion.

Coating Prevents Furring

FURRING of electric immersion heaters may now be prevented or minimized by the use of a coating developed by *Acheson Colloids Corp.*, Port Huron, Mich. Treatment consists of dipping, spraying or brushing the parts with the coating which hardens on exposure to light. The coating consists of a water suspension of colloidal graphite, a hardenable organic colloid and a hardening agent. Coating is said to improve heat conductivity and to possess a relatively high degree of resistance to abrasion.

Annealing Box Lifter

ANNEALING boxes can be lifted, without danger of warping the box bottom when being handled hot, by the new lifter designed by *Cullen-Friestedt Co.*, 1303 South Kilbourn Avenue, Chicago. The possibility of warping is removed by use of a continuous angle, which engages the bottom, in place of the previously used prong. Lifter illustrated has a capacity of 30 tons and can be operated by one man. Power and hand driven types are available.



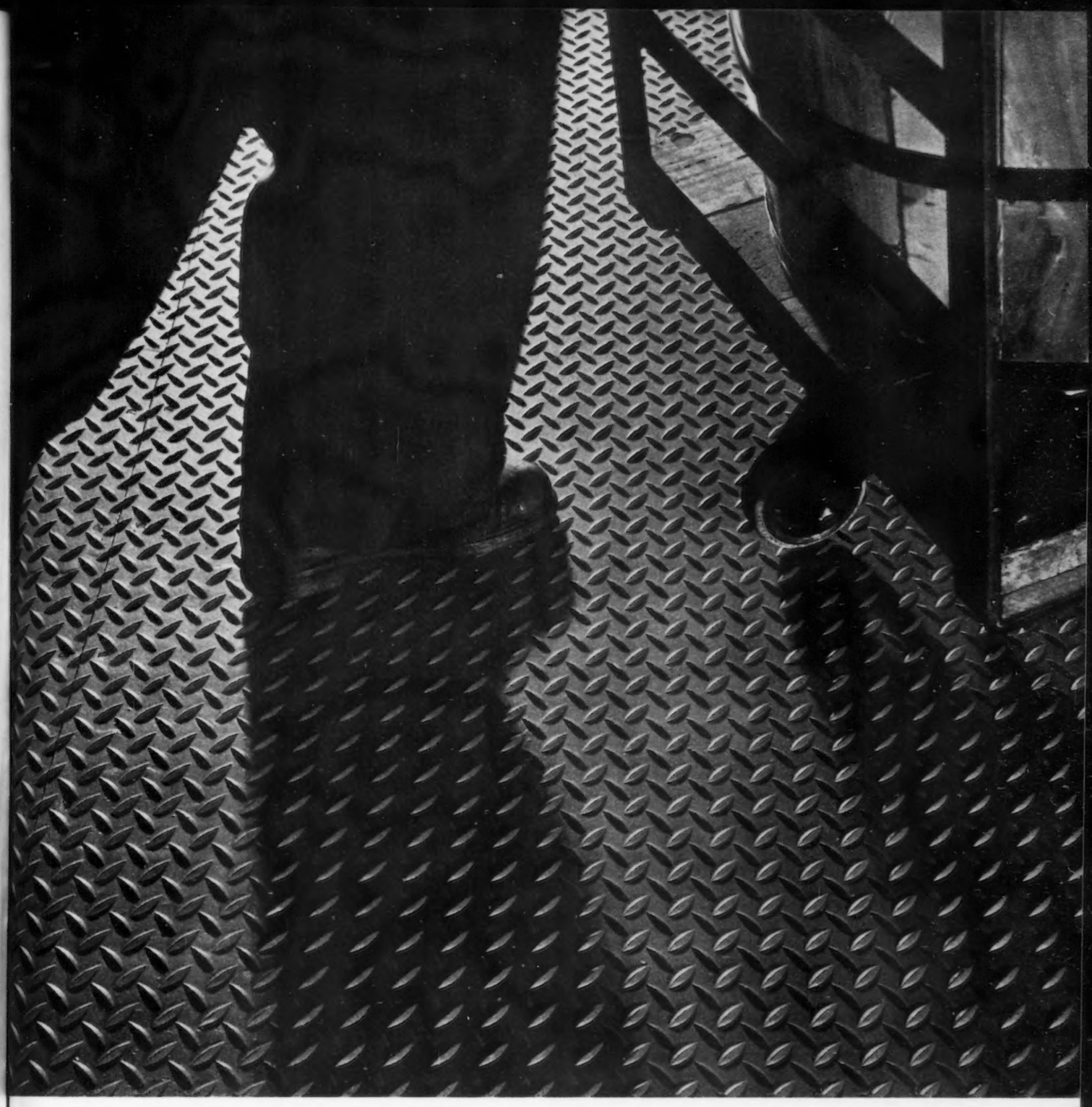


Photo shows the Super-Diamond Pattern of "A.W." Rolled Steel Floor Plate. Provides safe tread from any angle, under any condition.

Making floors permanently safe . . . Here's an end to flooring problems. With "A.W." Rolled Steel Floor Plate, there are no worn and slippery surfaces to endanger men on foot. No cracks or ridges to upset floor trucks. Toughest traffic will not damage or impair it. Oil-proof, heat-proof, fire-proof, crack-proof. Easy to clean, quick to drain. Pattern is uniform and can be readily matched when additional plates are needed. For complete information on "A. W." Rolled Steel Floor Plate, write for folder.

ALAN WOOD STEEL COMPANY

MAIN OFFICE AND MILLS, CONSHOHOCKEN, PENNA. : : SINCE 1826 : : DISTRICT OFFICES AND REPRESENTATIVES—Philadelphia, New York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, New Orleans, St. Paul, Pittsburgh, Roanoke, Sanford, N. C., St. Louis, Los Angeles, San Francisco, Seattle, Montreal—A. C. Leslie & Co. PRODUCTS INCLUDE—Steel Products in Carbon, Copper or Alloy Analyses : : Sheared Steel Plates : : Hot Rolled Sheets and Strip : : "A.W." Rolled Steel Floor Plates : : Billets, Blooms and Slabs : : "Swede" Pig Iron : : Reading Cut Nails.

On The Assembly Line

BY W. F. SHERMAN
Detroit Editor

·Automobile manufacturers now busy getting the "bugs" out of 1941 cars . . . Much attention being paid to Nash's new developments . . . Lack of Swedish steel has created a problem . . . Continental Motors reopens abandoned plant for airplane engine work

DETROIT—This is the season of the year when automotive engineers and production men are busily engaged in "getting rid of the bugs." This season, despite the fact that the industry made a start much earlier than usual this year, the experts are still engaged in this extermination process peculiar to the automobile industry, although it might have been expected that because of the earlier start they would be through the worst stages of it now.

"Getting rid of the bugs" is a perfectly natural process in a mass production industry where each vehicle off the assembly line must be the prototype of the basic model which preceded it. No matter how carefully engineers build test models and put them through their paces on the proving ground, practically every year at new model time the engineering department must get out its special brand of "flit," which means the application of many long and arduous hours to the job of finding out why some detail has not worked out in production the way it was intended. The detail may be something in the manufacturing, or something in the design of the car itself, or perhaps some difficulty with certain material. Difficulties of each type have been apparent this year and at least two of the major problems are still in the process of solution.

Outstanding from the technical viewpoint is a really important problem that was predicted in this column many months ago. (May 9, 1940.) It is the problem of replacing Swedish steel valve springs (now impossible to get) with a satisfactory substitute.

Lack of Swedish Steel a Problem

In the past Swedish steel has been almost exclusively used for automotive valve springs except by Ford Motor Co., which had developed a source of supply of American wire that did the job satisfactorily. Some engineers consider that Ford is fortunate in that the Ford engine does not use overhead valves, because that is where the greater part of the trouble is occurring now. The overhead valve springs are more highly stressed and are part of a more intricate mechanism than is used in L-head motors.

The problem is not blamed entirely on the absence of Swedish ore. In part, differences between American technique in producing wire and the Swedish method are believed to be responsible.

The manufacturing processes appear to be the most critical, since surface defects and imperfections, which appear to have been rolled into the metal, continue to appear as a major cause of spring failure. One typical failure examined recently was attributed to a seam to the center of the wire. The triple converted Swedish steel does not usually suffer from such imperfections.

Only two of the American mills have specialized in trying to meet the requirements of this type of spring wire and automotive people say that they are making rapid progress toward providing the material that is necessary. Meanwhile, however, this is Bug No. 1 for the automobile engine producers.

The aircraft industry probably is avoiding this problem — which would be a serious one for them — by 100 per cent inspection and by grinding and polishing the wire used for valve springs, although this is conjecture on the part of the automobile men here.

Bug No. 2 in the industry appears to be one of production. Nash, which has shown only handmade cars of its Ambassador 600 series, is having a lot of trouble getting these cars off its assembly line. No explanation has been forthcoming but it is understood that the problem of fabricating the body with integral frame is causing the delay. This is not unexpected in view of the fact that Nash has made radical departures from previous automotive practice and is trying to do on a very large scale what Lincoln-Zephyr did on a much smaller scale a few years back when it introduced the integral type construction.

Despite the fact that cars have not been delivered to competitive manufacturers for tests yet (it is normal practice for each manufacturer to buy samples of every competitive car on the market and put them through extensive proving ground tests to make comparisons with his own product) they are looking forward with considerable enthusiasm to the task ahead when they can obtain delivery of the 600 model. Frankly, two or three of the most forward-looking engineers have admitted recently that Nash has done a job which they have hankered to do.

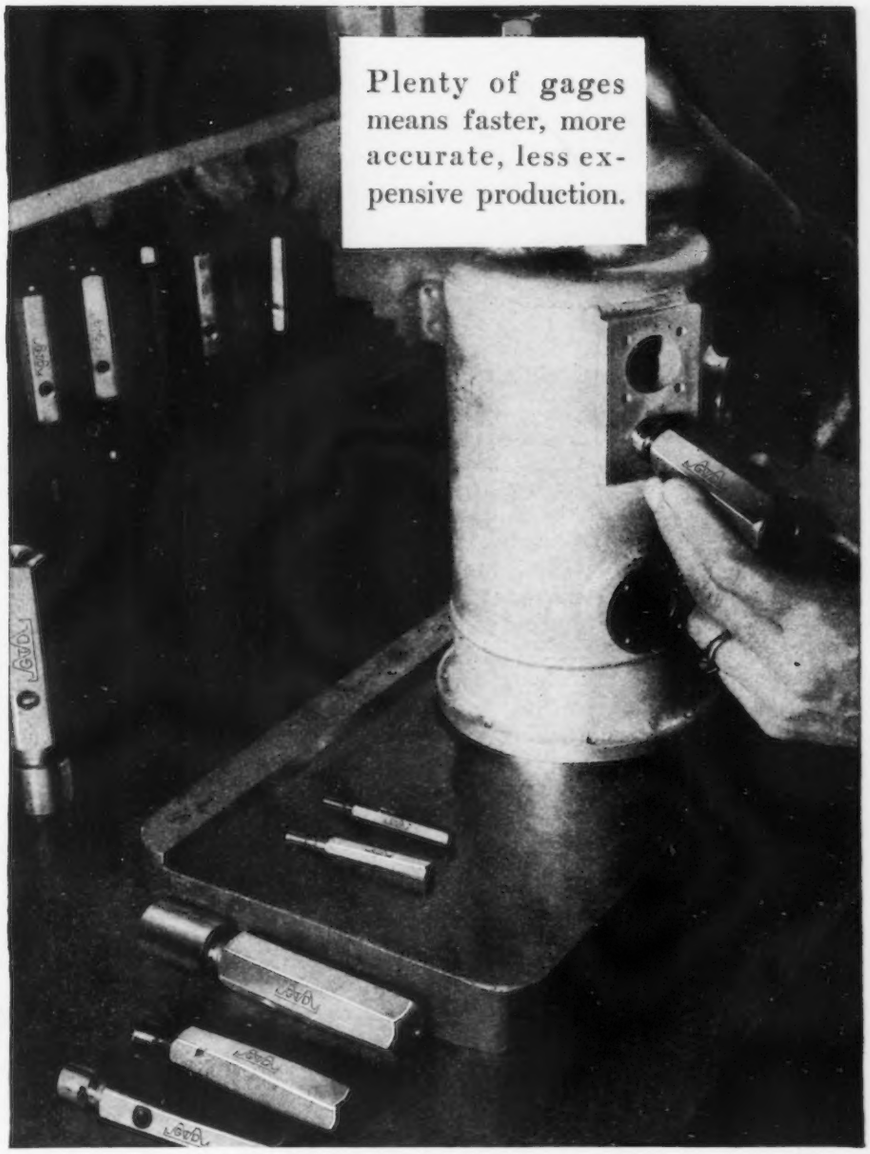
Nash Developments Being Watched Closely

They have their questions waiting for answer when the car does undergo tests, of course. Besides being interested in the integral body-frame combination in the 600 model, some of them are toying with an idea that Nash has used in its two bigger cars, the six and the eight. All three lines use exactly the same body, but the longer wheelbase cars have a subframe which takes the place of the conventional chassis frame.

In suspension, both the 600 and the six-eight lines have something new to offer, derived from foreign

Gyro Pilots

CHECKED WITH GTD GREENFIELD GAGES



Gyro pilots are extremely intricate and every part must be manufactured with unusual care and precision.

In this picture of the oil sump assembly can be seen 14 different "GTD Greenfield" Gages— reasons why this part will be *right*.

A long-time record for accurate manufacture, the development of special methods for giving gages long life (such as our "Rex" surface treatment) and our experienced gage engineering service make "GTD Greenfield" Gages especially interesting to any manufacturer who wants to make the most profitable use of his gage investment. A study of your needs will be made without obligation.

The "G.T.D. Greenfield" line of gages include plain and threaded, plug and ring gages; plain and thread limit-snap gages, and a large number of special types. All can be furnished with *"Greenfield's"* exclusive "Rex" Finish for extra long life, if required.

GREENFIELD TAP & DIE CORPORATION, Greenfield, Mass.

Detroit Plant: 2102 West Fort St. Warehouses in New York, Chicago, Los Angeles and San Francisco. In Canada: Greenfield Tap & Die Corp. of Canada, Ltd., Galt, Ont.

GTD GREENFIELD

TAPS · DIES · GAGES · TWIST DRILLS · REAMERS · SCREW PLATES · PIPE TOOLS

methods of coil spring wheel suspension. On the 600 the Nash front suspension is patterned after the Lancia, described here during the recent preview season. The two larger cars will be suspended in front on an independent coil spring suspension similar to the Mercedes principle. Always linked to the engineering problems in front suspension systems is the steering control linkage, which also will be subjected to critical analysis by the industry as a whole.

A major difficulty, and Bug No. 3 for the industry this year, was the problem of getting fenders and other sheet metal parts to fit the body properly. This frequently is a problem, but usually some tugging and twisting accomplishes the job. This year, however, it was necessary in many cases to drill special holes in sheet metal because the stamped holes did not line up. Whether misalinement could be attributed to rushing the die work toward the end of the season in some cases cannot be ascertained, but it matters little now because this bug has already been eliminated.

Continental Motors Corp. this week reopened its once-abandoned Detroit plant on East Jefferson Avenue to handle a sub-contract from Wright Aeronautical Corp. for production of 5500 Wright Whirlwind engines. This radial aircooled type will be consigned in part to the British Purchasing Commission. The balance of the output (about half) will go to the War Department.

Approximately $8,000,000 is being spent on tooling the 550,000 sq. ft. plant. It is planned to get into production in February and to reach peak output by June. If Continental is able to accomplish this in the time allotted, it will be doing a good job, as will the machine tool builders who will be called upon to deliver equipment in time for the start of production. However, Continental confirms that it expects to be able to get almost all of the required equipment, or at least 80 per cent of it, by the deadline, even without resorting to a request for priority. Attempts will be made to speed delivery of the rest of the equipment and some parts will be farmed out for manufacture.

In addition, many minor bottlenecks may be eliminated by calling on the Wright Aeronautical Corp. and its present suppliers to help out for a short while and eliminate danger of a hold-up because of shortage of one or two parts.

The Wright engine, developing about 300 hp., has been contracted for in a manner similar to the arrangement made by Ford for production of Pratt & Whitney engines under a licensing agreement.

Interesting is the fact that Continental attempted to get rid of the plant during the past year and turned down a bid of $574,000. Now it is ready to make use of the building to provide engines for the British and for the 25-ton tanks which Chrysler Corp. will make in the tank arsenal here.

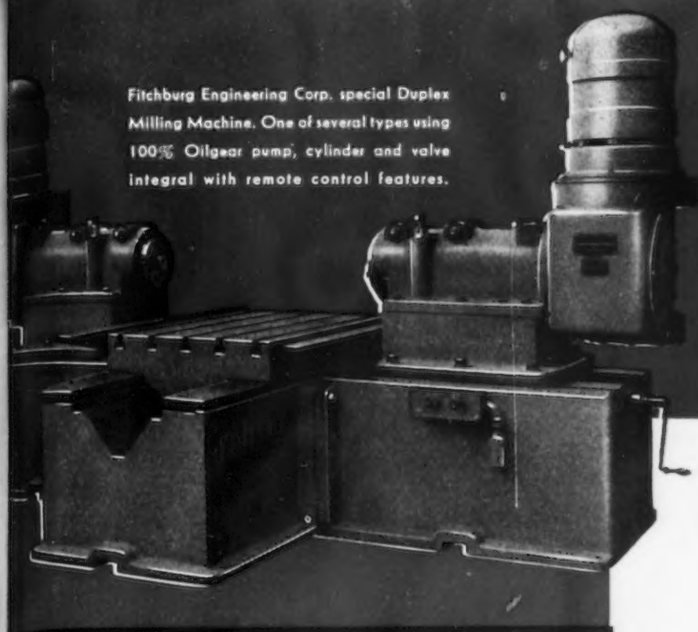
Continental is already engaged in the job of building $11,412,000 worth of automotive engines for the War Department and has a sizable backlog of orders for aircraft engines, automotive, agricultural and industrial power plants.

Presently employing less than 2000 men at its new main plant at Muskegon, it plans to increase the Muskegon payroll to about 4100 workers and put on about 3000 men in Detroit.

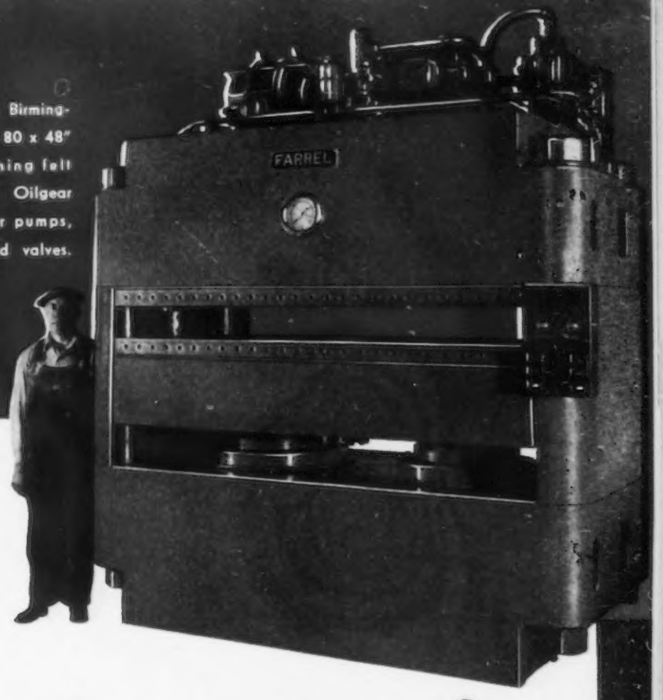
A note of caution has been struck in the automotive sales field and may be reflected in mid-November in the production schedules of the industry. Current sales reports are good but it must be remembered that the industry struck its stride earlier this year than ever before, at least two weeks earlier than it did last year. Therefore, orders have piled up earlier. Customer demand was stirred up earlier as is attested by those who find they must wait four or five weeks for delivery of a new car. However, it is apparent from a comparison of production figures and registration totals that inventory has surged ahead and will reach a peak shortly.

Production last week was in line with output in the previous week with only minor adjustments apparent so far. Output for the period ended Nov. 1 was 118,092 compared with 117,080 in the previous week and 82,690 in the corresponding week of last year, according to Ward's Automotive Reports.

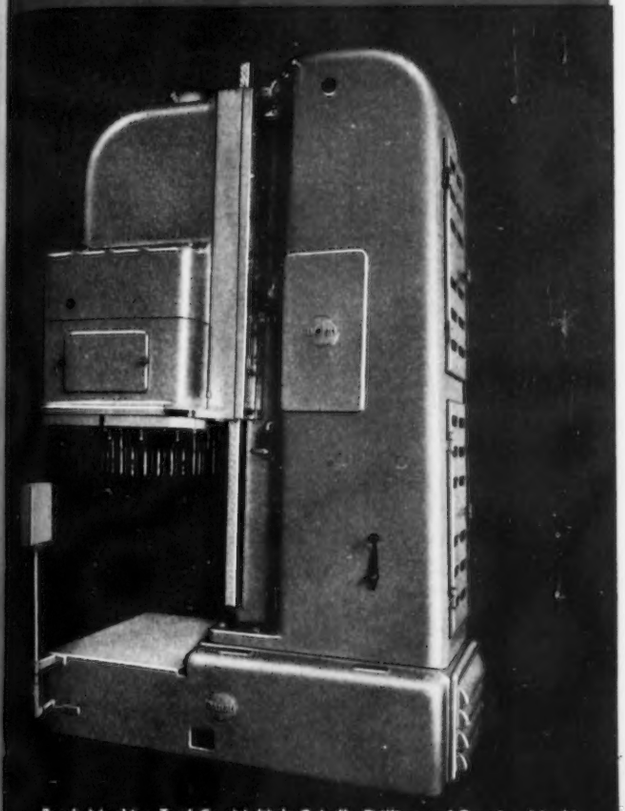
THE AUTOMOBILE INDUSTRY has pledged its aid in the manufacture of parts for airplanes. William S. Knudsen of the National Defense Advisory Commission recently met with leaders of the automobile industry in Detroit. From the left they are: C. E. Wilson, president of General Motors Corp.; Edsel Ford, president of Ford Motor Co.; Mr. Knudsen; K. T. Keller, president of Chrysler Corp., and Paul Hoffman, president of the Studebaker Corp.



Fitchburg Engineering Corp. special Duplex Milling Machine. One of several types using 100% Oilgear pump, cylinder and valve integral with remote control features.



Right: Farrel Birmingham 226-ton 80 x 48" single opening felt press, using Oilgear Fluid Power pumps, cylinders and valves.



Bauch Machine Tool Co. Multiple Spindle Drilling and Tapping Machine 100% Oilgear equipped. Said to be the first hydraulic combination machine.

There is no time for "*Time Out*" these days

Today, as never before, it is essential that production machines go right into production and *stay* in production. Busy factories have no time for "Time Out." Machine tool and machinery manufacturers themselves can't afford service complaints.

And so, machine tool and machinery manufacturers insist on having 100% Oilgear Fluid Power Equipment. They know a hydraulic system can be only as good as the pump and the cylinder and the valves. They know that all of Oilgear's unequalled experience in hydraulics goes into the design and construction of all of Oilgear Equipment. And they know that "100% Oilgear Equipped" is the strongest assurance of service they can offer their customers. Unequalled advantages result from this undivided responsibility which rests on Oilgear's leadership and fluid power achievements.

From a broad line of standard Fluid Power Equipment, Oilgear Engineers bring you "tailored to order" results that realize every objective you have in mind . . . a system that is simple to connect, operate and inspect. Oilgear *solutions protect machine manufacturers and users from every standpoint.* The urgency of the times calls for *dependable* Oilgear Fluid Power systems. Write for completely descriptive literature. THE OILGEAR COMPANY, 1309 W. Bruce Street, Milwaukee, Wisconsin.

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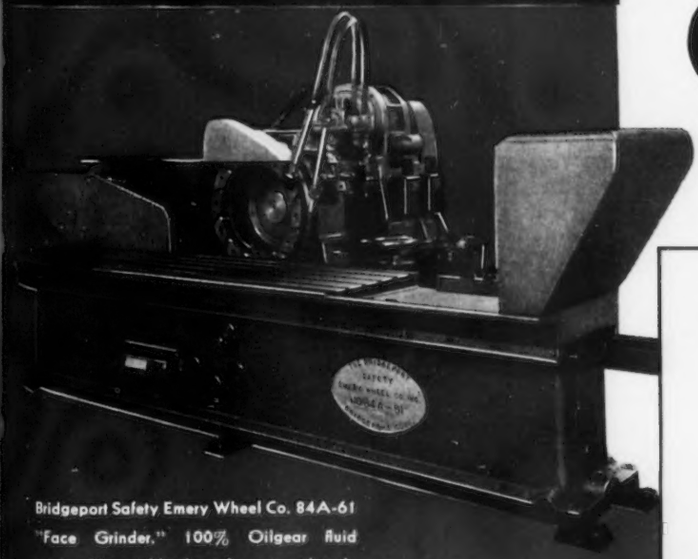

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Washington

BY L. W. MOFFETT
Washington Editor

• Steel price advance held unlikely as Administration, producers work together to prevent it . . . . Most consumers reported to have less than 90 days' supply . . . Airport work, calling for structural steel, is next pressing job

WASHINGTON — Both in Administration and steel circles, the view predominates that there will be no increase in prices. The one instance of an advance made in pig iron levels, attributed to higher costs of raw materials, is not expected to spread. Setting in motion an upward movement that would begin with raw materials and extend to finished lines is being carefully guarded against by both the National Defense Advisory Commission and the industry itself, even though some sources recognize that special conditions in limited cases would appear not to make maintenance of present prices a profitable venture.

As head of the defense commission's Price Stabilization Division, Leon Henderson clearly is leading the Administration effort to prevent prices from getting out of hand, and cooperation from industries has, with perhaps an exception or so, resulted in prices being frozen. One means of doing this has been to get producer and consumer together and work out their problem. An example was the conference scrap and steel interests held with Mr. Henderson. Scrap dealers reported that they could keep up the supply level without disturbing the price structure. Fears of steel makers inability to get scrap were allayed. Mr. Henderson had attributed rising scrap to the appearance of buyers in territories from which they had not formerly drawn "at a time that the steel operating rate was rising sharply." This condition was smoothed out to the satisfaction of both scrap dealers and steel makers, and avoided any necessity to increase steel prices by reason of higher scrap costs.

Prices Fixed by Government

Industry realizes as well as does the government the danger of runaway prices such as marked the outbreak of the World War. Even after the United States entered the war and prices were fixed by the government, they were greatly above prevailing levels. It is hoped to continue these levels voluntarily, though it obviously remains to be seen whether a rigid system of government price fixing and priorities will have to be established to control the general price structure and preferred deliveries for defense requirements. Indicative of the government prices fixed in 1917 was the valley price of $33 for basic pig iron, or $10.50 more than the present figure. The armistice was followed by a market collapse and in 1920 after a period of high prices, another collapse. Avoidance of those conditions is now sought. It is realized that if prices get out of hand, wages also rise with them and that the resulting demoralization is harmful to both industry and labor, and that moreover so-called profits will be only paper profits. The inevitable collapse not alone eats into them but taxes likewise will see them melt away.

Both the Administration and steel interests generally believe that market conditions point to getting off on defense and civilian requirements with a good start, though realizing that direct defense tonnage at present represents minor portion of output.

Regarding steel consumers, it has been pointed out that a great portion of them are ordering material for two purposes: (1) To meet their own requirements and (2) to build up inventories to a point consistent with prospective future needs. At the same time steel consumption has increased sharply in the past two months. It is expected to advance so that the tonnage now on order which can be earmarked for inventories, it is said, is probably much less than has been commonly supposed.

Consumption Ahead of Production?

Attention has been called to the fact that if defense and export tonnages are taken from the present steel production, the amount left for commercial use is not necessarily high. Actually, there are some authorities who believe that the total steel consumption in the United States now is ahead of production. The prevalent opinion is that this point is debatable.

It is also not believed that consumers are over supplied. Reports that are considered reliable indicate that steel inventories in the hands of consumers in only a few cases amount to 90 days at the existing rate of consumption. Most consumers are reported to have less than 90 days' supply. Due to long delivery commitments on various products, together with greater consumption, for both commercial and indirect defense purposes, it is doubted that inventories can be built up rapidly over the next few months. This, reports show, does not mean that there necessarily will be a shortage but rather that even if there are top-heavy inventories they will not be built up until sometime next year. Some point to the improbability of such inventories because of growing defense requirements which obviously will be given priority should that be necessary.

Because delivery promises on every steel product are running from three to 12 weeks, obviously there

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SUN OILS

PETROLEUM PRODUCTS FOR ALL INDUSTRIES

is no opportunity for steel producers to pile supplies at their own mills. There has been no chance to build supplies of semi-finished steel ahead of the mills and it is the belief that present inventories of raw material ahead of the finishing mills is much below normal.

With respect to the industry's position to serve defense demands at present, much of the work involves structural tonnage and deliveries are being made as quickly as possible. Fabricators also report that they can make quick deliveries, provided plans are not held up. Airport work, calling for structural steel and piling, it has been stated, will be the next pressing job.

Because of concentrated defense demands there are expected to be so-called bottlenecks but once they have been removed, no difficulty now is seen in getting steel for commercial and defense requirements or for the needs of Great Britain. This being the situation, the outlook for keeping of prices well in hand and the meeting of production demands are a source of strong encouragement.

Defrosters Ready for Grand Coulee Dam

Washington

• • • **Mammoth "defrosters,"** probably the largest in the world, are being installed at Grand Coulee Dam, Washington, now nearing completion, the Department of the Interior has announced. Commissioner John C. Page, Bureau of Reclamation, has reported that more than nine miles of electric heating cable and nearly an acre of steel plates were being placed along the top of the dam to insure proper winter operation. The statement continues:

"The gigantic heating apparatus will prevent ice formation which might freeze tight the 11 huge drum gates along the dam's 1650-ft. overflow spillway. The gates control the flow of the Columbia River over the dam.

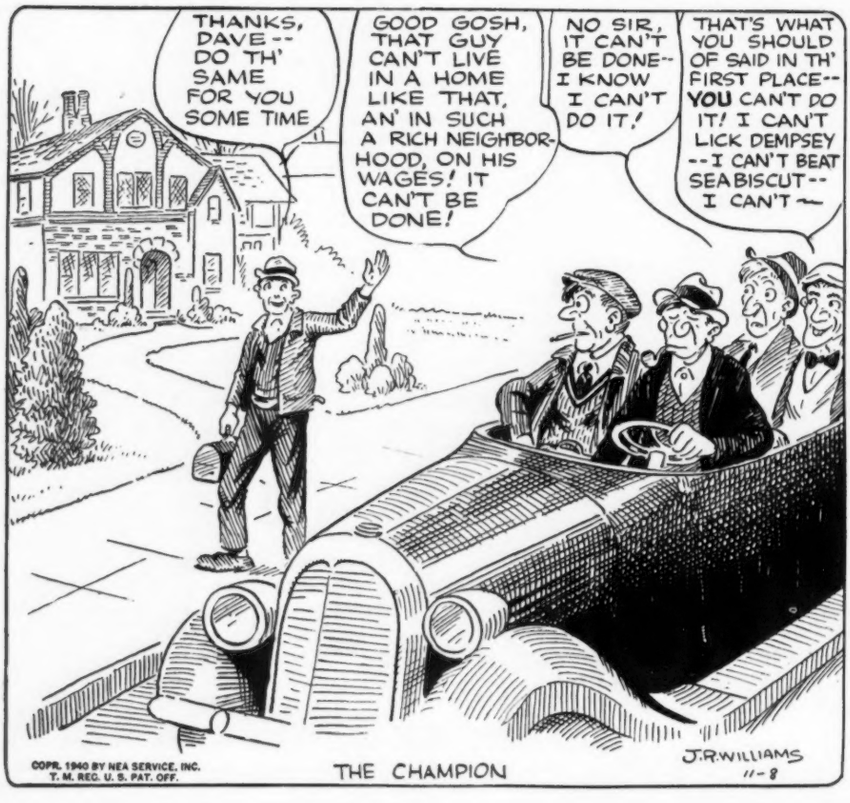
"The gates are designed to perform their task of flow regulation through flotation in water. Without 'de-icing' the ends of the gates would probably stick to the spillway piers during low temperatures, or an icy bond might form where they rest on their steel seats. Placing plates in the spillway and heating them will prevent this.

"The largest of the plates will be 135 x 8½ ft. There will be 11 of them. There will also be 22 pier plates, one on each end of each gate, which will contain approximately 875 sq. ft. each.

"The plates will be heated by induction, a comparatively new method of electrical heating. In ordinary heating the hot element, as in a stove is a metal of high resistance to electricity. This resistance causes the element to become hot and radiate heat. In induction, on the other hand, wiring is used to produce heat by setting up an electro-magnetic field around itself in steel plates wherever it is strung through them. Electric action by induction causes generation of heat in the plates rather than the wires.

"Electricity will be supplied from 22 150 kv-a transformers—two transformers per drum gate—located in the drum gate gallery immediately underneath gate chambers. In the neighborhood of 2,500,000 watts might be used for a really tough defrosting job."

THE BULL OF THE WOODS — BY J. R. WILLIAMS

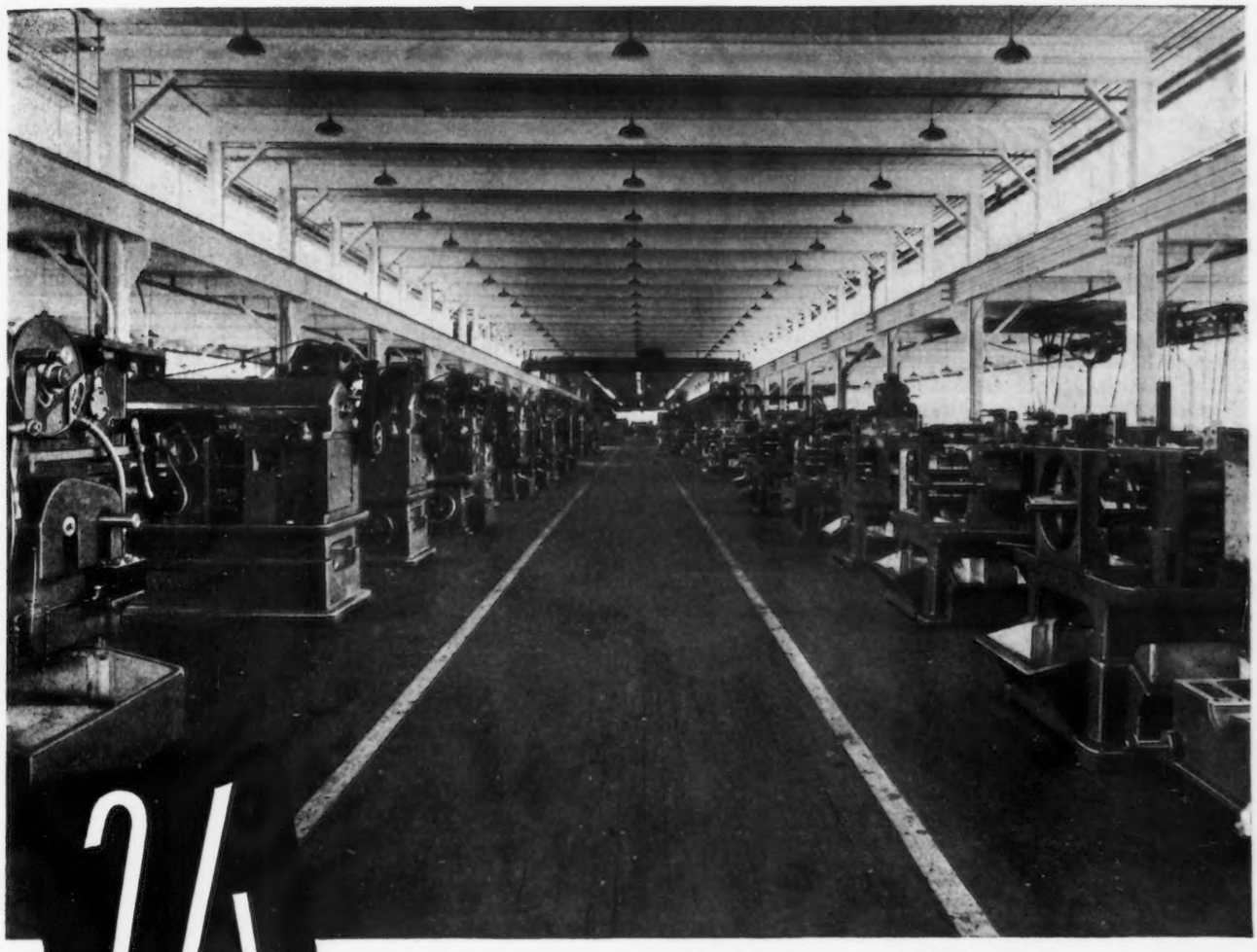

THANKS, DAVE -- DO TH' SAME FOR YOU SOME TIME
GOOD GOSH, THAT GUY CAN'T LIVE IN A HOME LIKE THAT, AN' IN SUCH A RICH NEIGHBORHOOD, ON HIS WAGES! IT CAN'T BE DONE!
NO SIR, IT CAN'T BE DONE-- I KNOW I CAN'T DO IT!
THAT'S WHAT YOU SHOULD OF SAID IN TH' FIRST PLACE-- YOU CAN'T DO IT! I CAN'T LICK DEMPSEY --I CAN'T BEAT SEABISCUT-- I CAN'T
COPR. 1940 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.
THE CHAMPION
J.R.WILLIAMS 11-8

Defense Board Studies Plan for Jobless Areas

Washington

• • • **A move to use** latent labor and plant capacities under the defense program in areas where unemployment has been greatest in recent years is being inaugurated by the National Defense Advisory Commission. Sidney Hillman, labor representative on the commission, has designated four investigators to survey conditions in Newcastle, Pa.; Carbondale, Ill.; and Cambridge and Mansfield, Ohio.

In attempting to revitalize industry in certain areas, the commission will use what Mr. Hillman described as the "farming out" method, under which work would be broken up among plants, diversifying industries in each area. He recalled that during the World War the Hog Island Shipyard was able to turn out two ships a week because 2300 different plants participated. Some plants, it was explained, produced only a single part but production was on a mass basis.



View of part of the Cone assembly floor

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FOR the past 24 years, Cone has designed and built automatic screw machines for the profitable production of thousands of types of machine parts. During these years, industry has accepted Cone machines as the last word in extracting the last cent of profits from screw machining operations. Cone engineers are backed by the years of experience necessary to design a machine to meet the modern demand for parts of extreme accuracy—at a price to beat competition.

Four-, six-, and eight-spindle Conomatics cover a range of work to include the requirements of every high production manufacturer. These machines are fully described in the Conomatic catalogs—have you sent for your copies?

CONE AUTOMATIC MACHINE CO., Inc., Windsor, Vt., U. S. A.

Fatigue Cracks

BY A.H.DIX

International Incident

• • • At the Metal Show a gentleman with a heavy French accent had completed a demonstration of a resistance welding machine, when an admiring onlooker remarked, "Damned clever, these Chinese!" The demonstrator flushed and said, "Sir, I am French, not Chinese."

Oriental Oddity

• • • A letter from the National Sun Yat Sen University Library, asking us to change the mailing stencil from Chengkiang, Yunnan, to Nan-Hsun, Kwangtung, brings us the most unusual name we have seen in a long time It is signed by the director, Prof. Ding U Doo.

No Muff by "Moff"

• • • Speaking of royalty, we would have bet eight to five that your Washington eye, ear and leg man, Leon Wesley (see page 70) Moffett, had dropped a "c" in his recent reference to "monarchial government." "Monarchical" is correct, but so is "monarchial," we are disappointed to learn.

Millions and Millions

• • • Just to keep our hands in we feel that we should remind you at least once every six months that your favorite family journal is the country's most widely quoted trade paper. A half dozen other trade papers make exactly the same claim. And although the matter is one that raises our temperature barely above room temperature, we will lay our clippings end to end against those of all comers.

We broke into millions of homes alone with Charles J. (Warner & Swasey) Stilwell's Oct. 24 story, *"How Big a Job Is National Defense?"* This was the one containing the pregnant paragraph:

> ". . . it seems to me very doubtful that the United States can build up maximum defense production and at the same time continue its present volume of production of normal peace time products."

How are you fixed for vacuum cleaners, garbage pails, motor cars and lawn mowers?

Redemption C.O.D.

• • • A Reading, Pa., manufacturer, whom we invited to join the big, more or less happy family, ignores our invitation and uses our c.o.d. order card to warn us:

> "Resist the devil when he comes around to tempt you and the old unrighteous beast will flee from you. The old dragon and his evil work will deceive you. Now, friend, you are not saved yet perhaps. Oh, be wise and get saved just as soon as you can."

We don't seem to be on the old so-and-so's prospect list, and furthermore, we think the Reading gentleman is taking a hell of a lot for granted. He might at least have sent us a questionnaire instead of jumping to conclusions.

The Girl Who Wasn't There

• • • Which reminds us that another election has come and gone and still we are on the poll conductors' list of forgotten men. We are beginning to feel that we are a wraith, like the devil, Santa Claus and our news editor's maid.

Well, it seems that our news editor, who moved recently to Westchester, a cook-in-every-kitchen-community, entered his young son in the local school. The other day the child brought home a drawing which he proudly exhibited to his father. "That's you," he said, "and that's momma." Our news editor noticed a third figure in the background and asked, "And who is that?" The child answered, "That's the maid." "But," objected the father, "we have no maid." "Well, anyway," said the child, "that's the maid."

Floor Covering Dept.

• • • While on a metaphysical binge, we might introduce a delicate point brought up by T. Wendell Lippert, our technical editor. He saw some framed 5-in. by 5-in. sections of carpet on display at W. & J. Sloan's, a local furniture house. The carpet is said to be that trod upon by England's king and queen on their visit last year to the World's Fair.

> "There are no footprints on the sections," says T.W.L., "so perhaps some particular 5 in. by 5 in. section was missed. Or could one section have been trod upon by both King and Queen and would that be valued more than one trod upon by only one, or none? And would you say that the electric meter that registered the current used by the King's electric shaver possesses value as a collector's item?"

The meter is out, as kings don't shave; they are shaved. A straight razor is *de rigueur*. Now, if you could lay your hands on the royal beard clippings and sell them at a quid each, you could pay off the national debt in no time.

Don't Miss It if You Can

• • • A Swiss engineer who recently visited this country raised our hackles by beginning a letter, "The IRON AGE is a paper I never would miss," but smoothed us down by following up with:

> *"It is sure a part of the industrial life in America, tells about the new manufacturing methods, about the new machines, short about everything which I like to know and to learn."*

Mrs. Grundy Thumbs Down

• • • Anent famous headlines, M. W. (E. C. Atkins & Co.) Dallas thinks we are missing a bet in not mentioning the hardware classic that capped a newspaper item about an amorous, escaped lunatic. We thought of it, and then thought better of it. The post office is narrow-minded.

Speech With Color

" • • • the peaks and valleys that have occurred in the machine tool industry during the 20 years since the first World War . . . make a cross section of the Rocky Mountains look in comparison to be as level as a Kansas wheat field."

—A. G. Bryant, page 66, Oct. 24 IA

"In the future our selling technique must be even more efficient, must be more creative. Every last vestige of the 'Diamond Jim Brady' type of selling must be removed."—*Ibid.*

Bell-Ringer

• • • We like to keep you in touch with the various "days" and "weeks," so that you can take steps to observe them properly. Among the recent ones were *National Gastroenterological Association Day, Dog Week, National Accordion Day, Candy Week, Donut Week,* and *Crude Rubber Credit Association Day.*

We missed up on an important one the week before last. It was *Better Parenthood Week,* and now it is too late to do anything about it, but next week is *Book Week,* and even though you have a book we urge you to get Ernest Hemingway's "For Whom the Bell Tolls," the best piece of writing we have seen in many a year.

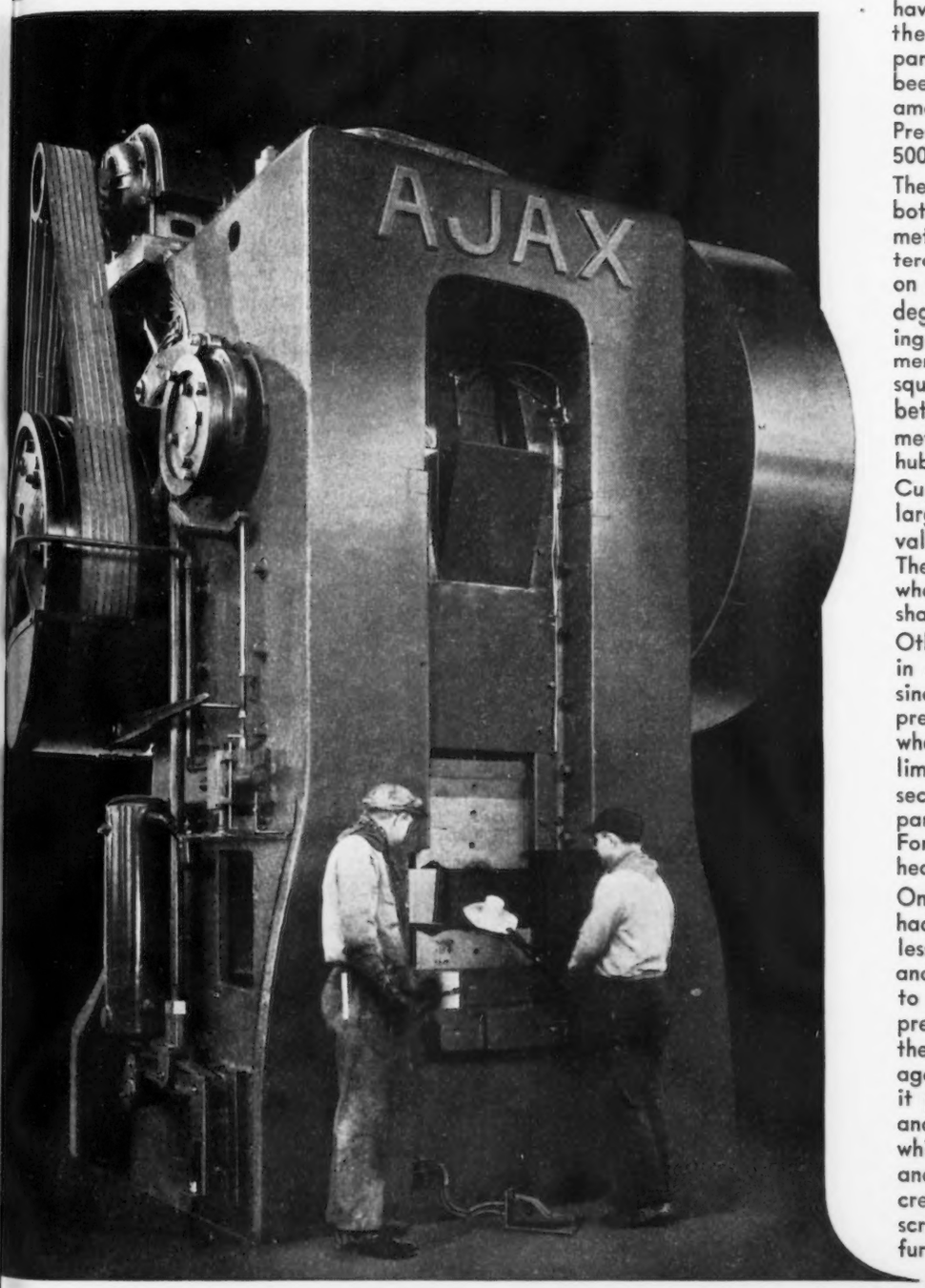
Puzzler

• • • A.D.W. says the Oct. 24 ladder touches the wall at 19 ft. 5 11/32 in., and is 4 ft. 8⅛ in. distant from the wall. But no word yet about last week's bridge and juggler problem.

One of the most famous cerebral carbon removers of all time is Sam Loyd's "How Old is Ann?" problem. You can set your own par:

> The combined ages of Mary and Ann are 44 years, and Mary is twice as old as Ann was when Mary was half as old as Ann will be when Ann is three times as old as Mary was when Mary was three times as old as Ann. How old is Ann?

An extensive variety of parts have become practical press forgings on AJAX Solid Frame Forging Presses



STIMULATED by demands for increased production, reductions in cost, and improvements in quality, production executives have sought and obtained one, or more, of these advantages through making various parts by the press forging process. This has been happening with a growing frequency among users of Ajax Solid Frame Forging Presses, which are available in capacities of 500 to 2,000 tons.

The production of certain classes of forgings, both hot and cold, of ferrous and non-ferrous metals, including an extensive variety of interchangeable parts, is being accomplished on Ajax Solid Frame Forging Presses with a degree of accuracy and economy far surpassing the work of other types of forging equipment. Using blanks of round or round-cornered square stock, sheared to length, and up-ending between the dies, it is possible to produce symmetrical forgings such as gears, driving flanges, hubs, and rock drills.

Cup or shell-type forgings, also forgings with large heads and slender shanks, like poppet valves, are produced by the extrusion process. The extrusion process is a practical method whenever volumetric relation of head and shank would make upset forging difficult.

Other types of forgings are being produced in direct competition with hammer forgings, since stock may be forged flat-wise in these presses. Required variations in cross-sections, when not too great, may be obtained by preliminary fullering operations. Where the cross-sections vary excessively, blanks may be prepared by pre-rolling in Ajax Wide-Adjusting Forging Rolls, and press forged at the same heat as rolled.

One after another of the restrictions which had handicapped progress on the older, slower, less rigid, and less accurate crank, toggle, and hydraulic presses, have yielded and ceased to exist since the advent of these forging presses. Operating up to twice the speed of the fastest presses of equal tonnage ten years ago, Ajax Solid Frame Forging Presses make it possible to obtain unforeseen advantages and economies in the production of parts which can be converted into press forgings, and the variety of such parts is steadily increasing. Write for Bulletin No. 75, which describes Ajax Solid Frame Forging Presses, and further defines their production possibilities.

THE AJAX MANUFACTURING COMPANY

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EUCLID BRANCH P.O. CLEVELAND, OHIO

201 DEWART BUILDING NEW LONDON, CONN.

News of Industry . . .

Bethlehem's Backlog Tops Billion; Output at 103%, Employees 123,343

• • • **Bethlehem Steel Corp.'s** order backlog—due largely to its 19 per cent share of the two-ocean navy building program—on Sept. 30 set an all-time record at $1,123,081,930, Eugene G. Grace, president of the company, said last week.

He announced an increase in Bethlehem's common dividend to $1.50 (from $1.25 quarterly) and reported third quarter profits, after all charges, of $12,462,288 against $5,377,470 in the like period last year. The third quarter was the best in the company's history. Of the many phases of the Bethlehem company's business Mr. Grace said:

PRODUCTION—October set a new ingot production record at 1,014,000 tons, which was 231,000 tons above the peak 1929 month of May. Output for October was 103 per cent of capacity. Third quarter operations averaged 99.9 per cent, against 82.6 per cent in the second quarter and 70.1 per cent in the third quarter of 1939.

EXPORTS—In the first nine months of 1940 Bethlehem exports totaled 28 per cent of the company's total shipments. This compares with an average of 13 per cent for 1937, 1938 and 1939.

PRICES—The current level of steel prices is satisfactory and there will be no need to advance prices in the fourth quarter or later unless costs of material and wage rates are advanced.

CAPACITY—With good management existing facilities in the steel industry can take care of any demand. Let us not add to the problems which will have to be solved (after the war) by creating an excess capacity for producing a staple commodity. Inflation of capacity for production of commodities is brother to a monetary inflation. No one is going to be hurt if the government and industry get together on priorities. The U. S. defense program and aid to Britain will not take more than 25 per cent of the industry's 82,000,000-ton annual capacity.

ADDITIONS—The Federal government has set aside $53,000,000 for additions to Bethlehem facilities (chiefly shipbuilding capacity and forging capacity) which can be acquired later by the company. During the last nine months the company has spent $19,000,000 for improvements and will spend $21,000,000 more in the next six months. Of the total amount $10,000,000 is for special war materials manufacture.

EMPLOYMENT — The company's payroll reached a new high in the third quarter with 123,343 employees compared with 112,316 in the second period of 1940 and 95,571 in the third quarter of 1939. Wages and salaries paid in the third quarter totaled $54,984,000 against $38,731,000 in the second quarter and $38,731,000 in the third period of last year. The hourly average rate of pay was 93.2c. an hour, against 93.1c. in the second quarter and 91.4c. in the third quarter of 1939. The third quarter work week averaged 36.6 hr. against 35 hr. in the second quarter.

LABOR—We do not have signed agreements with any union and are not negotiating with the CIO on any such contracts. We have had no part in any action which

TWO LIQUID-COOLED Allison engines, mounted with pusher-type propellers, drive this new YFM-1A 5-place fighter plane just delivered to the U. S. Army Air Corps at Wright Field, Dayton. The plane carries a crew of five.

Photo by International

would make our policy on labor appear to be a political issue. The labor policy of the company can be stated as follows:

It has been our practice to engage in collective bargaining with employees for the last twenty years, or about fifteen years before any laws were enacted to require this.

We believe in collective bargaining as a principle and as defined in the National Labor Relations Act, and we are complying in every respect with that law—statements to the contrary notwithstanding.

We want our men to have any kind of an organization and any kind of representation they want for collective bargaining, and we will recognize any agency they choose. We have not and will not influence them in the choice of an organization or representation in any respect. We have no right to recommend any one union to them.

In those of our plants where a majority representation has been achieved by any means and certified as such under the law, it has been recognized by us as the bargaining agency for the employees in those plants.

Where no majority representation exists, we are recognizing and dealing with the representatives of all groups for collective bargaining. There is an orderly and legal way for any organization and any union to proceed and establish itself for the purpose of collective bargaining, and that is for the employees and not for the company to say.

Sheet & Tube Bond Issue Finds Demand

Youngstown

• • • An issue of $45,000,000 Youngstown Sheet & Tube Co. first mortgage 3¼ per cent bonds offered Oct. 29 at 103 met a good reception. The bonds offered were $10,000,000 fewer than the issue they replaced and increased the demand for the issue. Proceeds of the new issue and that of $10,500,000 additional debenture bonds, sold privately, will be used to retire the company's outstanding $55,500,000 mortgage bonds bearing 4½ per cent interest.

Inland's 3rd Quarter Operating Rate 101.2%

• • • **Inland Steel Co.**'s average rate of operations in the third quarter was 101.2 per cent of capacity and for the first nine months of 1940 was 89.5 per cent, Edward L. Ryerson, Jr., chairman, reports. The company declared the regular quarterly dividend of $1 and an extra cash dividend of $1, both payable Dec. 2 to stock of record Nov. 15.

"It should be pointed out," said Mr. Ryerson, "that our theoretical capacity is predicated on the assumption that we can operate at only 87½ per cent of full capacity under average conditions, because of holidays and the necessity for repairs. It is, therefore, possible at times for operations to exceed 100 per cent of theoretical capacity.

"Tonnage exported increased in September to 13.2 per cent of total shipments; percentage for the third quarter having been 8.6, and for the nine months, 6.4.

"For the past two months," he continued, "incoming business has been in excess of outgoing shipments despite our high rate of operations and consequently our backlog has grown considerably. Nevertheless we have been able to satisfy the requirements of our customers in an orderly manner. Defense orders are, of course, being given precedence in our schedules wherever special attention is needed."

It appeared likely, he said, that October shipments would break all past records.

"Employment also reached a new high," Mr. Ryerson said, "with an average number of employees for Inland and subsidiaries of 20,412 in the month of September.

Wheeling Profit for Quarter $1,611,108

• • • **Wheeling Steel Corp.** and subsidiary companies report a net profit, after all deductions, of $1,611,108 for the quarter ended Sept. 30, equal to $1.99 per share on outstanding common stock, compared with profit of $1,504,647 or $1.81 a share in the similar 1939 period. For the nine months ending Sept. 30, the company reports net profit of $3,275,186, equal to $3.23 per share, compared with profit of $3,043,303 or $2.84 a share in the corresponding 1939 period.

National Supply Co. and its subsidiary corporations report consolidated net profit for the first nine months of 1940 of $989,650, compared with a net loss of $199,447 in the corresponding 1939 period. For the 12-month period ending Sept. 30, they report a profit of $2,379,883, compared with a loss of $92,661 for the previous 12-month period.

Right To Examine Pay Records Upheld

Washington

• • • **Refusal of the** Supreme Court to review a case involving Montgomery Ward & Co., in which the company challenged the right of the government to subpoena payroll records, is regarded by the wage-hour administration as validation of the division's practice of making routine inspections of all payroll records of covered employees.

Section 11 of the Fair Labor Standards Act empowers the administrator to "enter and inspect" payroll records in employer establishments and the division, in view of the Court of Appeals decision in Chicago, insists that its practice of inspecting records of all employees of a covered firm engaged in interstate commerce, whether or not complaints have been filed, has been upheld.

Coming Events

Nov. 8 and 9—Industrial Management Society, Third National Time Motion Study Clinic, Chicago.

Nov. 13 and 14—National Founders Association, 44th annual meeting, New York.

Dec. 2 to 7—National Exposition of Power and Mechanical Engineering, New York.

Dec. 9 to 13—National Association of Manufacturers, annual meeting, New York.

Hoover Co. to Build Shell Fuse Plant

Canton, Ohio

• • • **Construction and** equipping of a four-story factory building representing an investment of approximately $625,000 to handle a $3,923,300 order for two types of shell fuses for the United States Army Ordnance Department have been announced by the Hoover Co. at nearby North Canton. The new building, which will be 80 x 120 ft., will cost $125,000. Machine tool equipment for the new structure will cost approximately $500,000, officials said.

Globe Machine Issues Stock for Expansion

Cleveland

• • • **Globe Machine & Stamping** Co. has been authorized by the State Securities Division to issue 3200 shares of $10 par preferred and 16,340 shares of $5 par common stock to acquire 80 per cent of outstanding shares in the Crescent Machine Co., Leetonia, Ohio. Division Chief Paul L. Selby said the metal stamping firms would combine operations, but retain separate plants and personnel. He estimated aggregate assets at "in excess of $850,000." Globe officers, all of Cleveland, are: R. S. Geddes, president; R. E. Wilcox, vice-president and treasurer, and W. H. Annat, secretary.

Republic to Expand at Houston, South Chicago

Cleveland

• • • **Seven acres of land** in the Esperson tract adjoining its present pipe yard on Greenwood Street, Houston, Texas, have been leased by Republic Steel Corp., it was announced by the company. The additional space will permit increasing the number of pipe stocking racks. Construction likewise will be started immediately on two new buildings, both of which are to be used by Truscon Steel Co., a subsidiary of Republic Steel Corp.

Expansion of Republic Steel Corp.'s warehouse facilities at its South Chicago wire mill will be undertaken immediately.

Goodyear Aircraft to Build Navy Blimps

Washington

• • • **To comprise** the first of 48 non-rigid airships authorized under the Navy's 10,000-plane program, an undisclosed number of blimps will be constructed by the Goodyear Aircraft Corp., Akron, under a $1,324,000 contract awarded by the Navy Department. Patrol airships will be 400,000 cu. ft. in volume, 246 ft. long; training ships will be of 123,000 cu. ft. volume, 147 ft. in length.

New Allegheny Ludlum Warehouse in Los Angeles

Pittsburgh

• • • **Allegheny Ludlum** Steel Corp. has announced construction of a new warehouse on Pacific Boulevard, Los Angeles. The new building will be a concrete industrial building and is necessitated by the growing business of the corporation on the Pacific Coast.

MORE PLANT area for flying fortresses—Growth of Boeing Aircraft Co.'s No. 2 plant at Seattle, where 4-engine flying fortresses are built, is shown in this photograph. The original factory floor area was 166,000 sq ft. Latest addition just completed is 660,000 sq. ft. while further extension now planned will lift the plant to 1,900,000 sq. ft.

Canada's Pig Iron Output Gaining

Toronto

• • • **Pig iron production** in Canada for September totaled 105,020 long tons, a new peak for the year and the third highest record in history. September's output of pig iron was exceeded in August, 1929, when 112,526 long tons were reported, the highest record in the history of the industry, and December, 1918, when output stood at 106,000 long tons. September's output compares with 88,885 tons in August, and 65,954 tons in September, 1939. Output for the month under review included 92,839 tons of basic; 7533 tons of foundry iron and 10,648 tons of malleable iron. All the foundry and malleable iron as well as 4616 tons of basic iron were made for sale.

Cumulative production of pig iron in Canada for the nine months ending with September totaled 845,456 long tons against 487,982 long tons in the corresponding period of 1939. For the current year pig iron production averaged 93,262 long tons per month, a new all time high record, and compares with a monthly average of 54,220 long tons in 1939, a monthly average of 90,000 tons in 1929 when the previous high record was attained and compares with 89,000 tons per month for 1918, the record production year during the World War.

During September, nine blast furnaces were blowing with output of 93 per cent of all of Canada's possible production. Only one furnace was down. Following furnaces were in blast throughout the month: Dominion Steel & Coal Corp., Sydney, N. S., three; Algoma Steel Corp., Sault Ste. Marie, three, this company having the only idle stack in the Dominion; Steel Co. of Canada, Ltd., Hamilton, two, and Canadian Furnace Co., Port Colborne, Ont., one, the latter being the only entirely merchant furnace in the country.

Output of ferro-alloys in September rose to 13,147 long tons from 9697 tons in August and 10,406 tons in September, 1939. For the nine months ending with September cumulative production totaled 90,345 tons compared with 51,098 long tons in the corresponding nine months of 1939.

Production of steel ingots and direct steel castings in September fell to 164,515 long tons compared with 172,210 long tons in August and 124,384 long tons in September, 1939.

Output of steel ingots and direct steel castings for the nine months to September 30 totaled 1,464,548 long tons against 937,693 tons in the corresponding period of 1939. In the 1940 period, production was at the all time high record monthly average of 162,728 long tons compared with monthly average in 1939 of 104,188 long tons; and 117,000 long tons per month in 1937. The previous high record was made in 1918 when the monthly average was 139,000 long tons.

Canada rapidly is becoming established as an important iron ore producer. The New Helen Mine in the Michipicoten area of Ontario, controlled by Algoma Steel Corp., now is producing beneficiated ore by means of a sintering plant, at a rate of 300,000 tons per shipping season; the New Helen Mine started production in September, 1939, and since that time has been providing a substantial part of the iron ore used

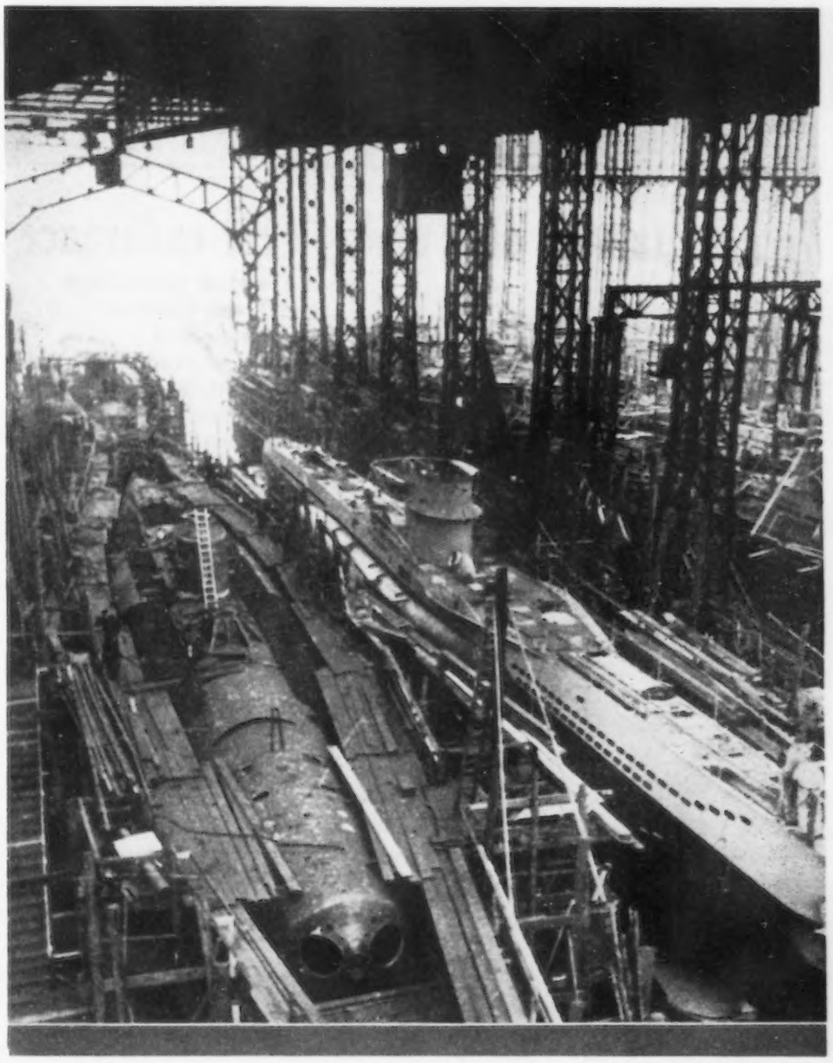
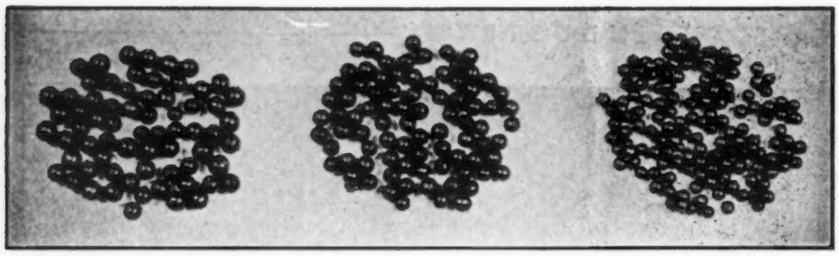


Photo by Wide World

SUBMARINE PRODUCTION line—Here is a production line of German undersea boats (passed by German censor). Chancellor Hitler has boasted of the speed of German submarine construction.



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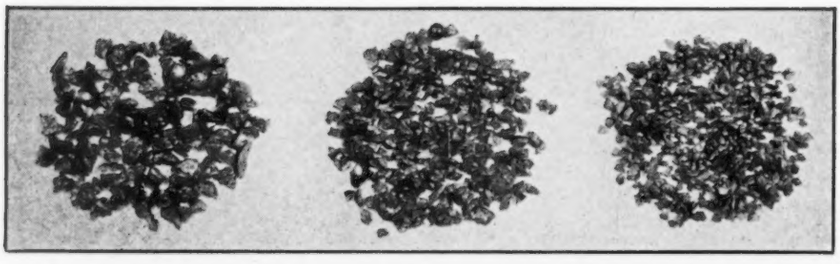

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in the blast furnaces of Algoma Steel Corp., Sault Ste. Marie.

Announcement was made in Government circles at Toronto that Steep Rock Iron Mines, located in the Atikokan area, 130 miles west of Port Arthur, Ont., is seeking permission to drain the lake on the property so that the vast deposit of high-grade iron ore may be developed. At present the Ontario Hydro Electric Power Commission is using the lake as a power source and if drained other power sources will have to be utilized in the developing of power for the district. Development work at the Steel Rock property has been proceeding for about 18 months and a vast iron ore body has been outlined and partially developed. It is expected the mine will go into production next year. Officials claim the Steep Rock ore carries a content of about 60 per cent metallic iron, and a phosphorous content low enough to make the ore a Bessemer grade.

Dominion Will Build Large Bomb Plant

Ottawa

• • • **Canadian government** is extending the scope of its war production effort and C. D. Howe, Minister of the Department of Munitions and Supply, says that arrangements are nearing completion for manufacture of 500-lb. aerial bombs. A large plant is nearing completion in Quebec and bomb production will commence next February. Normal output of the plant will be well over 100,000 bombs a year. Eventually production will embrace all types of bombs ranging from 40 to 1000 lb. in weight from the common high explosive to serial projectiles capable of piercing heavy armor plate. This will be the first time bombs have been made in Canada. Mr. Howe further stated that plans are under consideration for the production of anti-tank mines and depth charges, munitions never before attempted in the Dominion.

Department of Munitions and Supply placed contracts valued in excess of $14,394,812, of which almost $8,000,000 were for construction projects, including new plant construction, heating, water and sewage equipment for structures nearing completion. The

above total also includes orders placed with United States companies to the value of $154,127. Orders announced during the past week include:

Aircraft—The DeHavilland Aircraft of Canada, Ltd., Toronto, $51,184; Turnbull Elevator Co., Ltd., Toronto, $31,687; National Steel Car Corp., Hamilton, Ont., $34,102.

Dockyard supplies — Dominion Engineering Co., Ltd., Montreal, $56,080; United Steel Corp., Ltd., Toronto, $70,252.

Motorized transport — International Harvester Co. of Canada, Ltd., Ottawa, $91,894.

Electrical equipment—Northern Electric Co., Ltd., Ottawa, $45,-238; MacLennans Ornamental Iron Works, Toronto, $33,750.

Machinery—E. W. Bliss Co. of Canada, Ltd., Toronto, $39,625.

Fire fighting equipment—Walter Kidde & Co. of Canada, Ltd., Montreal, $183,444; Two Fire Equipment Co. of Canada, Ltd., Toronto, $183,444; LaFrance Fire Engine & Foamite, Ltd., Toronto, $169,338; Pyrene Mfg. Co. of Canada, Ltd., Toronto, $167,900.

Munitions—The Frist & Wood Co., Ltd., Smiths Falls, Ont., $50,-996; Anaconda American Brass, Ltd., New Toronto, Ont., $95,950.

Ordnance—War Office, England, $50,400.

Miscellaneous equipment—S. S. Holden, Ltd., Ottawa, $127,000; Gillette Safety Razor Co. of Canada, Ltd., Montreal, $36,800; Dominion Rubber Co., Ltd., Montreal, $50,950; B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, Ont., $76,800; R.C.A. Victor Co., Ltd., Ottawa, $27,518.

Tin Ore Discovery Reported in Egypt

Washington

• • • **Important deposits** of tin ore discovered by a government expedition in Egypt's eastern desert are reported in a dispatch to the Commerce Department. Samples of the ore are described as being of good quality but it is said that investigations have not progressed sufficiently to estimate accurately the quantities of tin available from the newly-discovered source.

NOW THAT ELECTION'S OVER . . .

Let's go to work!

We still face the same old world . . . with the same people having the same characteristics. The election has not solved our problems. We still have unemployed, we have people on relief and rapidly increasing debt. And above all, we have the immediate necessity of planning and carrying forward a National Defense Program. This is a job for all of us.

MONEY—First of all we need money. It must come from "we the people" through taxation. The cost of our program adds to the bill we all have to pay. We must get our dollar's worth for every dollar expended.

MEN—For years we've been trying to solve our unemployment problem from the standpoint of men who need jobs. Now let's solve it from the standpoint of jobs which need men. We will need the help of every able-bodied man and woman in these United States. Let's train them.

SPEED—The best way to make haste is to have a carefully worked out plan. Set up a program based on . . . (1) Types and quantities of products needed. (2) Approved specifications. (3) Sources of material. (4) Capable plants and equipment. (5) Delivery schedules required by actual Army and Navy programs.

Remember, this is our job and we're spending our own money. WE MUST GET THE BEST RESULTS FOR THE LEAST MONEY IN THE SHORTEST TIME.

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September Scrap Exports Decline But Japanese Shipments Increase

• • • **Despite a sharp** increase in shipments to Japan, total exports of scrap in September showed a 27 per cent drop below the August level. Spurred by the embargo, which became effective on Oct. 15, Japanese shipments rose to 148,332 tons, or 59 per cent of all scrap exports, as compared with 137,429 tons or 40 per cent in the previous month, according to records of the Department of Commerce.

The movement to United Kingdom dropped sharply to 75,049 tons in September from 136,604 tons in August. It is believed that while October shipments may show a further decline from the September level, the movement to Great Britain in the future will probably average closer to the September level of 75,049 tons than to the high August total.

Canadian shipments also declined in September, the movement for that month being 22,298 tons, as compared with 55,117 tons in August.

The heavier shipments to Japan and the reduced volume of Canadian exports resulted in a proportionately heavier movement from West Coast ports in September. At West Coast ports in September originated 20 per cent of all exports, as compared with 12 per cent in August. East Coast ports accounted for 56 per cent in September against 52 per cent in August. The Great Lakes area was responsible for only 4 per cent in September, as compared with 14 per cent in the previous month. Activity at Gulf ports was relatively unchanged in September.

See tables A and B.

Scrap Exports to Principal Buyers
(Per Cent of Total Exports)

	Sept.	Aug.	July	June	Aver. for 1939 •
United Kingdom.	30	39	43	49	14
Japan	59	40	35	18	57
Canada ...	9	16	17	17	5
Italy	..	..	..	6	12
Others	2	5	5	10	12

September Scrap Exports—Tons

From ↓ To →	Japan	United Kingdom	Canada	September Total	August Total
Maine and New Hampshire	5,192	4,573	301	10,066	5,474
Massachusetts ...	6,270	15,414	....	21,684	34,709
Rhode Island	4,126	....	....	4,126	6,487
Connecticut	5,183	....	....	5,183	....
Buffalo	....	....	4,715	4,715	3,473
New York	21,926	15,841	....	37,767	50,960
Philadelphia	....	3,041	....	3,041	9,100
Maryland	3,908	6,471	....	10,379	22,071
Virginia	....	13,257	....	13,257	31,025
N. Carolina	1,457	....	....	1,457	4,821
S. Carolina	1,515	....	....	1,515	**
Georgia	4,557	5,248	....	9,805	2,988
Florida	10,909	....	....	10,909	3,134
Mobile	9,789	....	....	9,789	10,777
New Orleans	8,028	....	....	8,028	19,295
Sabine	6,995	....	....	6,995	1,897
Galveston	8,227	11,204	....	19,431	39,788
Laredo	3,572	....	....	3,572	1,756
San Diego	2,965	....	....	2,965	**
Los Angeles	15,466	....	....	15,466	15,210
San Francisco ..	2,279	....	....	2,279	7,376
Oregon	15,917	....	....	15,917	11,796
Washington	9,551	....	382	9,933	7,786
Duluth and Superior	....	....	4,625	4,625	24,601
Michigan	....	....	10,585	10,585	18,378
Total Tons	148,332†	75,049†	22,298†	251,116*	346,087*
Total, Value	$2,521,381†	$1,378,535†	$343,971†	$4,318,837*	$5,741,660*

Table covers only shipments by principal customs areas to larger foreign buyers.
† Covers all exports, including small tonnages from customs areas not shown in tabulation.
* Covers all shipments to all countries from all customs areas. ** Negligible.

Japan Combats Scrap Shortage

• • • **American export** restrictions on scrap steel is a subject of comment in several Japanese industrial magazines and trade papers. In a series of articles, *Diamond* reviews Japanese efforts in the past to meet the long-threatening embargo on scrap shipments to Japan. Construction of new blast furnaces has not kept pace with the rising demand for steel products, the magazine says, adding that there is apparently no other way of stepping up pig iron production than by more rational operation of the existing capacity, and by more extensive adoption of special processes for the manufacture of steel from iron sand, lean ore, and sulphide slag.

Rationalization of blast furnace operations would be contingent, in the first place, upon Japan's ability to acquire ores of higher iron content and purity, and also a superior grade of coking coal. Possibilities in this direction appear distinctly limited.

As to the alternative mentioned by the magazine, already 10 blast-furnace "ersatz" processes have been tested in Japan, by 18 concerns. With the exception of the crucible, electric high-frequency smelting and the Matsukawa processes, all processes so far tested are based on the rotary-kiln principle. A great amount of capital has been expended toward acquiring patented rotary-kiln plants and processes from abroad, the Krupp-Renn installations alone reputedly involving an amount of 10 million yen.

Beside the Krupp process the Basset process is most popular, and various sponge iron processes are also in use.

The Krupp rotary furnace produces iron "luppe" (granules) from an intimate mixture of crushed ore and fuel. The latter may be of very low quality, even peat and lignite, it is claimed. The operating temperature ranges from 1300 to 1500 deg. C. The legitimate process is used by the Mitsubishi Mining Co. at its Seishin, Korea, plant, and by the Showa Steel Works at Anshan,

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Manchuria. The Kawasaki Heavy Industrial Co. plans to use a similar process for the treatment of iron sand from Kuji, and also the Riken concern and the Nippon Special Steel Co. have worked on similar processes.

The Basset process can be worked in cement kilns. It produces cement clinker besides pig iron of very high purity. Raw materials are either crushed or powdered ore or sulphide slag (from sulphuric acid plants), with ordinary coal or anthracite as fuel. Smelting temperatures are lower than in Krupp plants, about 1100 deg. C., but the continuous operation of the process involves great difficulties. Several cement firms, including Osaka Yogyo Cement, Chichibu Cement and Asano Cement, have recently turned some of their idle kilns to the production of pig iron by the Basset process. The Chosen Nitrogen Fertilizer Co. plans to refine sulphide slag by it.

The Oriental Economist reports that the Basset process has been adapted by the Nippon Special Steel Tubing Co. to the treatment of iron sand. An outstanding feature of the process, it is claimed, is that it perfectly eliminates titanium, whose presence has provided a major difficulty in refining sand iron, and that it retains large proportions of vanadium, while phosphorus runs as low as 0.0007 per cent. By the new process it is possible to produce steel without scrap iron, it is claimed. The company earlier this year increased its capital from 20 million yen to 32 million yen, partly for the purpose of industrializing the process on a large scale. Besides special steel, the company plans to produce ferronickel in the kilns. Because of the recent suspension of the ban on nickel exports from New Caledonia, Nippon Special Steel Tubing hopes to acquire large amounts of ferronickel ore from the French colony, where a Franco-Japanese concern affiliated with the Nomura interests of Osaka has been exploiting deposits for some years. The ore contains 48-52 per cent iron, 0.8-1.2 per cent nickel, less than 5 per cent silicon, 0.04 per cent phosphorus and less than 0.4 per cent sulphur.

Sponge iron is produced by the Nippon Sand Iron Co. and the Kotobuki Heavy Industrial Co., the latter using hematite as charge. The kilns are heated to 900-1000 deg. C.

Production cost of these scrap substitutes is high. "Luppe" comes 190-200 yen a ton, Basset pig iron 150 yen, and even the lowly sponge iron 100 yen. By comparison, the official sales price for blast-furnace pig iron is 91 yen a ton, and American scrap averages $19 a ton, or 82 yen. Moreover, shutdowns are more frequently necessary than in orthodox pig iron plants.

A departure from the rotary principle is the Matsukawa process, credited to Dr. Matsukawa, of Osaka Imperial University. Principal feature of the process is the use of open hearths for the refining of iron ore. Eight furnaces of the Matsuo Foundry Co. have been altered to produce steel by the Matsukawa method. Experimental operation is said to have proved the commercial merits of the process, and the company is seeking official authorization to build several large Matsukawa hearths, it is reported. The steel, as smelted from iron ore, contains less than 0.5 per cent carbon, less than 0.1 per cent silicon, less than 0.1 per cent manganese, less than 0.035 per cent phosphorus and less than 0.05 per cent sulphur, according to Dr. Matsukawa. Because of its inhomogeneous quality it cannot be rolled unless once more smelted in an open hearth.

GUNNERY GRADUATE — One of the graduates of the bombing and gunnery school, at Jarvis, Ont., is shown here behind a machine gun on a training plane.

Prentis Says Defense Program Needs Real Head

Cleveland

• • • **The national defense** program needs coordination by an executive head with real authority, less red tape and more standardization of specifications, said H. W. Prentis, Jr., president of the National Association of Manufacturers, in an address here Monday, Oct. 28.

Mr. Prentis, head of the Armstrong Cork Co., Lancaster, Pa., spoke at a one-day industrial leadership conference sponsored by the N.A.M. and attended by 400 northern Ohio business men.

In an address on economic planning, J. Howard Pew, president, Sun Oil Co., and national vice-president of the National Association of Manufacturers, said there was no surer way of ruining a man than for some one else to plan his life for him. "There is no surer way of ruining a nation," he added, "than for the government to plan for the lives and activities of its people, for a nation can be no greater than are its people."

The Cleveland meeting was one of a series sponsored by the NAM.

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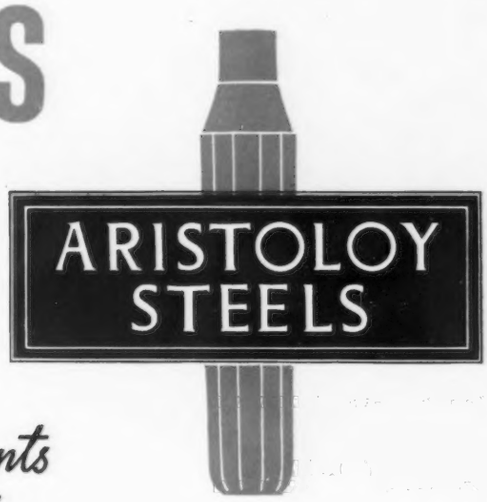

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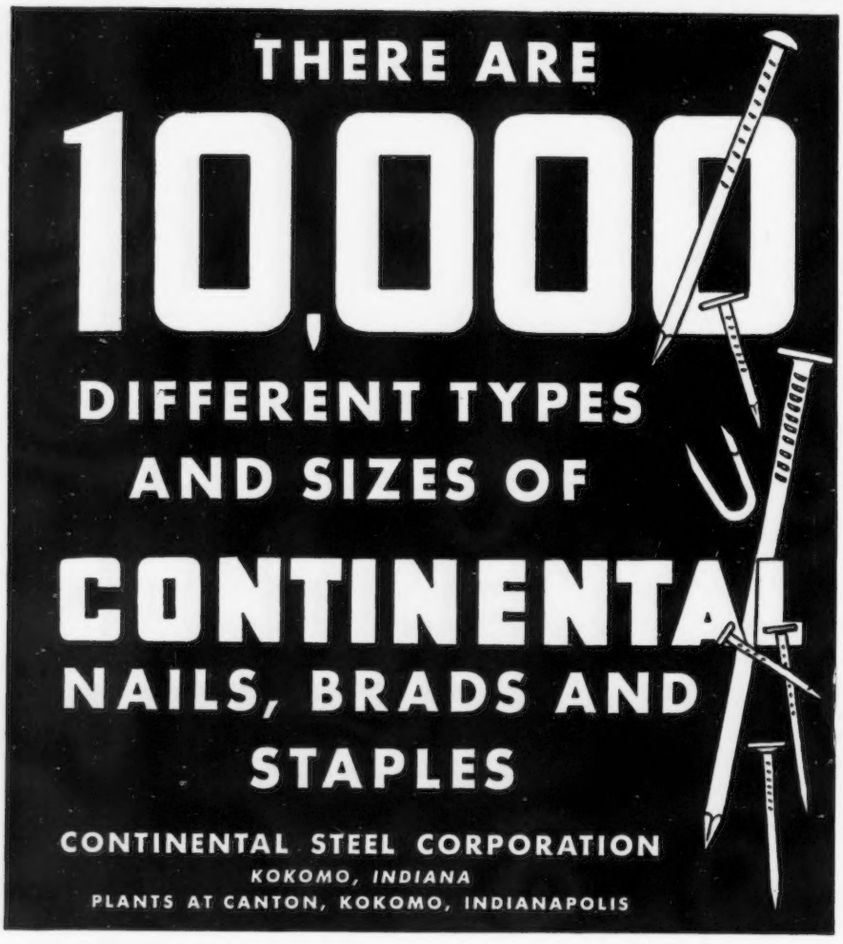


New Test Method For Stainless Steel

Washington

• • • **A new testing method** for ascertaining its maximum compressive strength is expected by the Bureau of Standards to increase the use of stainless steel in the manufacture of aircraft and possibly to appreciably speed airplane production.

"Stainless steel possesses high strength and is very resistant to corrosion," said Dr. Lyman J. Briggs, director of the bureau. "With a full knowledge of its compressive properties, engineers need no longer hesitate to consider the use of this widely available material for aircraft and other lightweight structures."

Part of a research project undertaken for the National Advisory Committee for Aeronautics and financed by eight different manufacturers, the special test was designed to eliminate the difficulty of buckling under stress when compression tests are made on thin sheets of stainless steel. A test specimen of many pieces stacked side by side in playing-card fashion, cemented together and supported to prevent lateral buckling, was described by bureau engineers as making possible the testing of steel sheets .002 in. in thickness under a load of 110 tons per sq. in.

Swedes Report Metal Plating of Pottery

Washington

• • • **A metal covering** giving earthenware the strength and gloss of hard metals has been developed by a Swedish chemist. According to a Commerce Department dispatch from Stockholm, the process involves a galvanic plating of the pottery with what is described as layers of several metals which become chemically united to the treated earthenware.

Output of Plastic Materials Increases

Washington

• • • **Production of** plastic materials in 1939 was valued at $63,054,576, compared with $52,417,797 in 1937, according to the Bureau of the Census.

Jobs in Steel Plants Up 5000 in September

• • • **Employment in** the steel industry rose during September to an average of 565,000 employees, according to a report released by the American Iron and Steel Institute. This was the fifth consecutive monthly gain in employment in the industry. In August, an average of 560,000 workers were on the industry's payrolls, while in September, 1939, employment averaged 502,000.

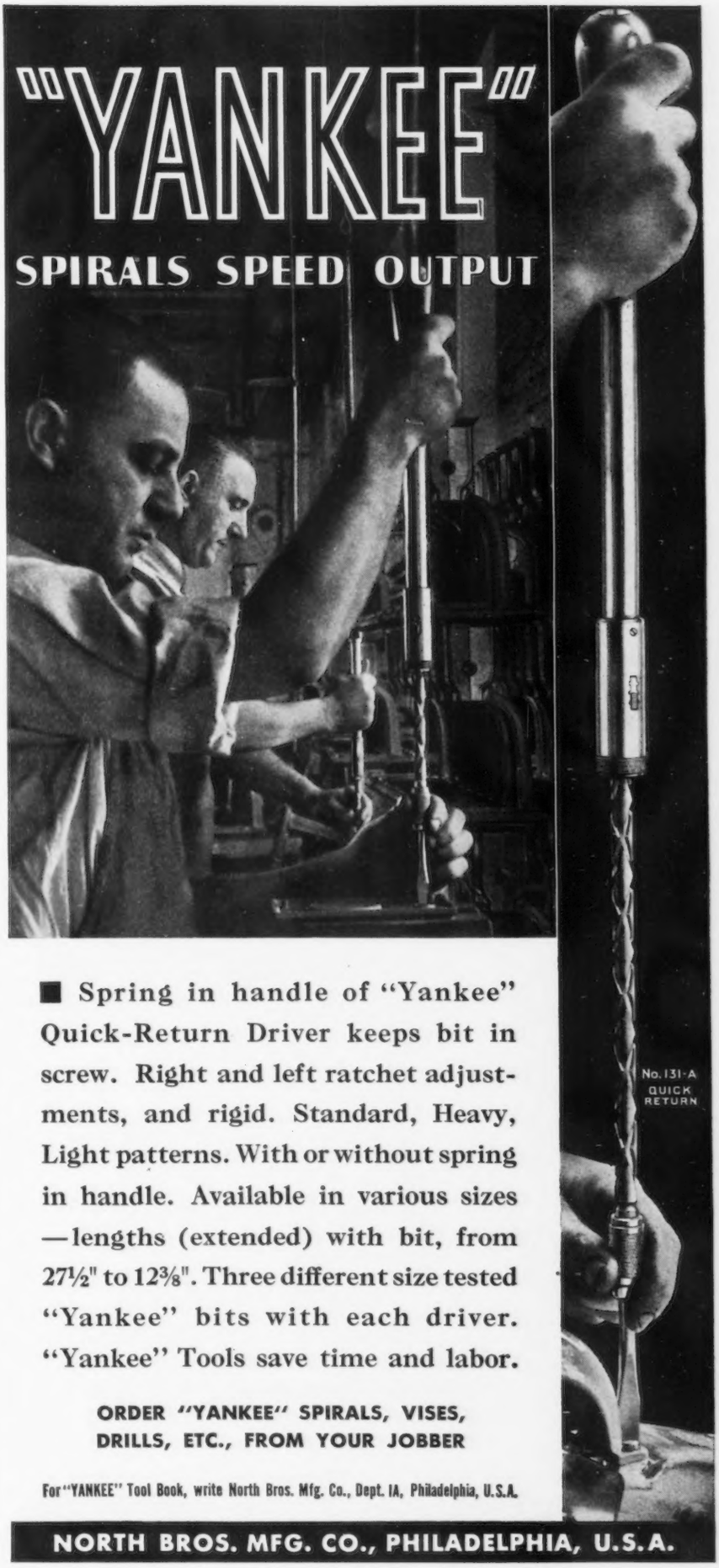
As a result of the smaller number of working days in September, due to the Labor Day holiday and to the fact that there was one less day in the month than in August, payrolls were slightly lower in September than in the preceding month. Payrolls during September totaled $82,068,000, compared with $83,837,000 in August, and with $69,735,000 in September, 1939.

The number of hours worked per week by steel wage earners averaged 36.5 in September, which compares with 36.7 in August, and with 35.0 in September, 1939.

Wage earning employees earned an average of 85.4 c. an hour in September, as against 85.1 c. in August, and with 84.7 in September, 1939.

ASME Mechanical Catalog Being Distributed

• • • **The 30th annual** A.S.M.E. Mechanical Catalog and Directory, 1941 edition, is now being distributed to members of the society. It is available from the American Society of Mechanical Engineers, 29 West 39th Street, New York, at $3 per copy to non-members. The publication contains an illustrated catalog section describing machines, equipment and materials, followed by an index of practically all American manufacturers of metals and alloys, power plant equipment, power transmissions, instruments, material handling apparatus, aircraft power plants, instruments, foundry and machine shop equipment, heating, ventilating, and air-conditioning machinery, electric motors and controls, equipment for process industries, pumps, fans, compressors, and other types of mechanical apparatus. Also listed in the 1941 volume are hundreds of trade names of equipment.



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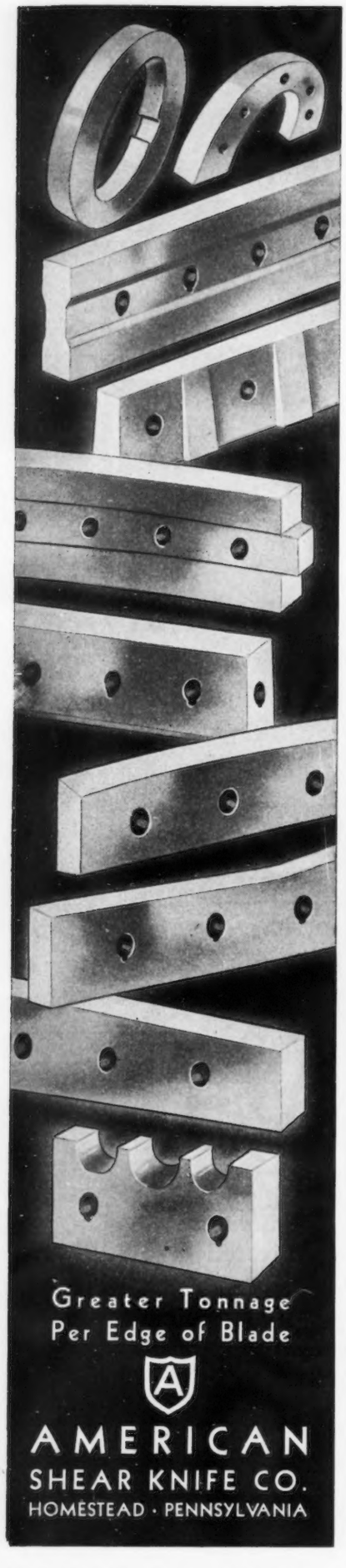


Rules Men Called, Kept Waiting, Must Be Paid

Milwaukee

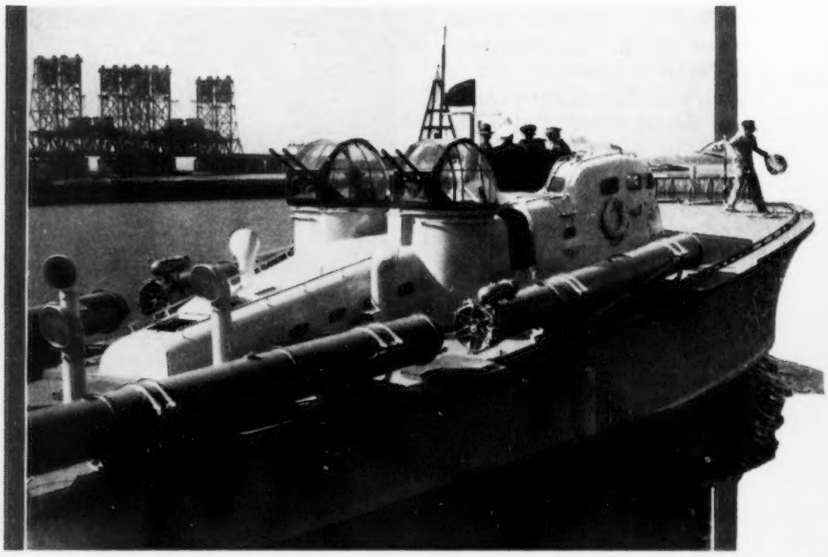
• • • **Employers who call** men on their waiting lists to report for work at a definite time and then keep them waiting until they actually start on the job, must pay such men wages from the time they report under a ruling by the wages and hours administration, according to Tom O'Malley, NLRB regional director, who spoke at a recent meeting of the Milwaukee Federated Trades Council. He said that waiting time must be figured as part of the work day and if the employer requires the waiter to work a full day on top of his waiting time, the extra time involved must be paid for on a time and a half basis.

Month's Machine Tool Exports to U. K. $15,070,249

Washington

• • • **Exports of** industrial machinery during September declined 4 per cent from the August total but exports of power-driver metal working machinery surpassed the previous month's record total and reached a new high of $22,452,289, according to the Machinery Division of the Department of Commerce.

Shipments of machine tools to England mounted to $15,070,249, compared with $12,480,621 in August and $7,954,726 in July, while consignments to Japan declined to $587,632 from $1,875,503 in August. Comparable exports to the Soviet Union dropped to $894,999 from $1,795,826.



SHIPYARD INSPECTION—This new 60 mph. motor torpedo boat, a unit in the nation's growing navy, carried Secretary of the Navy Frank Knox and other officials on an inspection of the Federal Shipbuilding Co., at Kearny, N. J.

Willys Gets $8,820,040 Of Shell Contracts

Toledo

• • • **Contracts for** $8,820,040 of shell parts have been received from the War Department by Willys - Overland Motors, Inc. Plant officials said it would require weeks to tool for production. A substantial increase in employment would result, they said. The company now has at work about 1200 men as it is increasing production on its 1941 car.

Blaw-Knox Unfilled Orders at New High

Pittsburgh

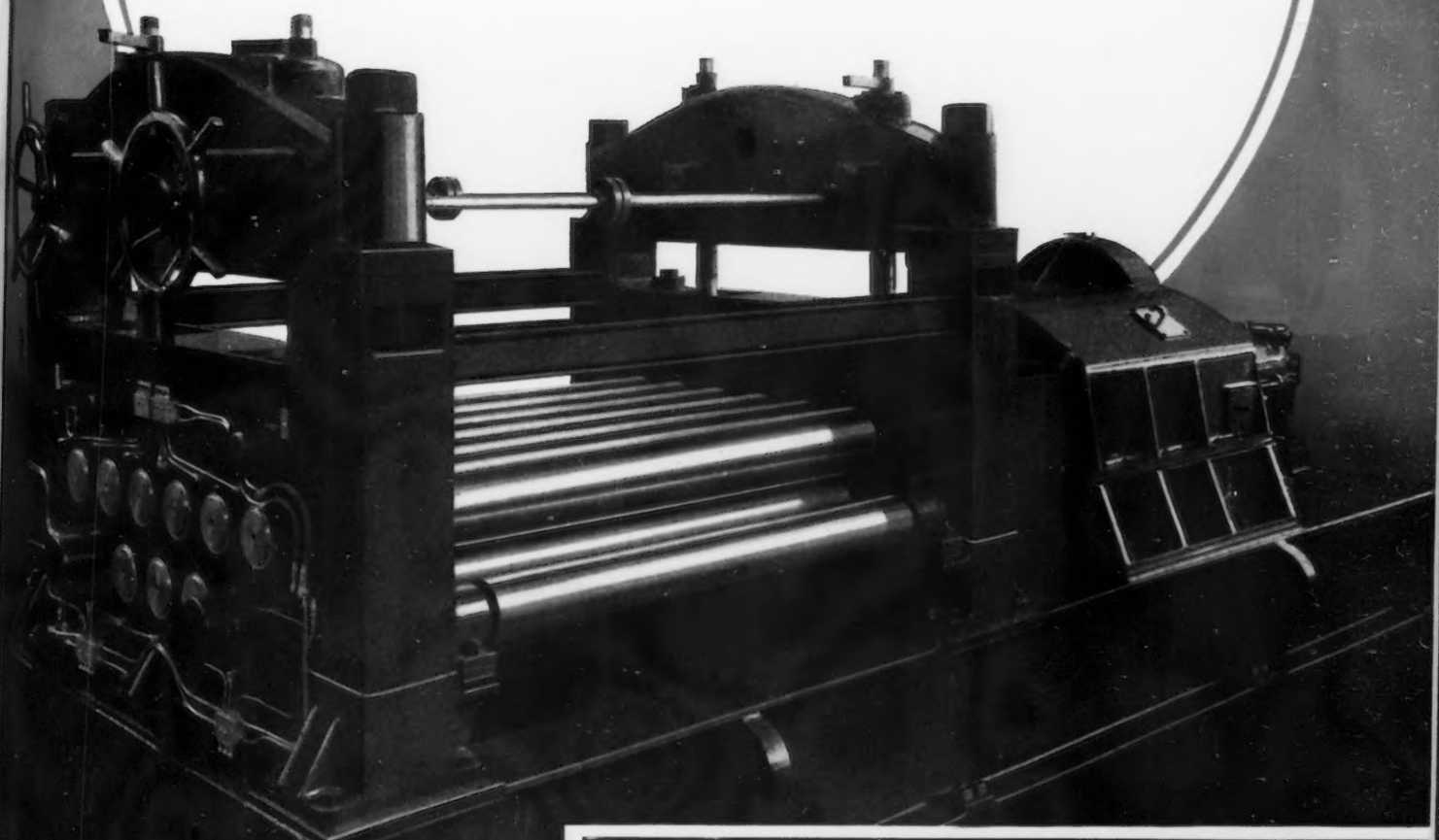
• • • **At the present** time unfilled orders at Blaw-Knox Co. are the highest in the company's history, due in part to the company's participation in the national defense program, according to W. P. Witherow, president. Directors last week declared a dividend of 12½c. per share payable Dec. 17 to stockholders of record at the close of business Nov. 18.

McKAY HEAVY DUTY ROLLER LEVELLERS

McKAY Heavy Duty Roller Levellers are specially designed for heavy work such as light armor plates for tanks.

They are furnished to level various widths and thicknesses of all kinds of plate.

Give us your requirements and we will submit specifications for the size and type of Leveller you need.



The McKAY MACHINE Company
ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO
ASSOCIATED COMPANY
The WEAN ENGINEERING CO., Inc. • WARREN, OHIO

MANGANESE ORE SUPPLIES FOUND AMPLE FOR 18 MONTHS

• • • **Industry's position** with regard to manganese ore is summarized by "Mining and Metallurgy," publication of the American Institute of Mining and Metallurgical Engineers, an article on manganese and preparedness. The article notes that:

(1) Present stocks of manganese ore of ferro-grade are equivalent to consumption for about eighteen months.

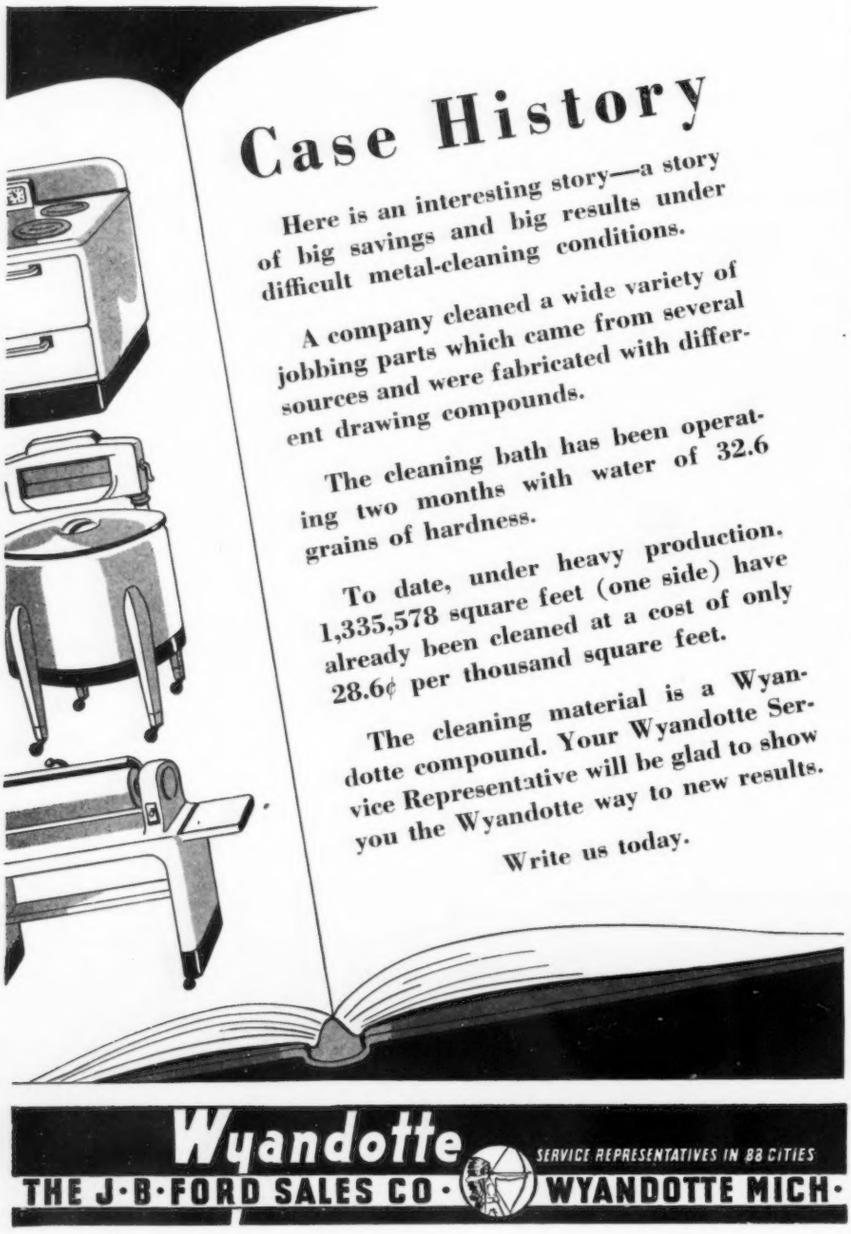
(2) Shipments from foreign countries in the first half of 1940 were in excess of current needs, and substantial quantities will continue to be imported. Nevertheless, intelligent foresight and common sense dictate that definite provision be made for supplying, say, 500,000 tons of ferro-grade material per year from domestic sources against possible need.

(3) Hundreds of relatively small deposits from which ore of acceptable grade can be produced will yield substantial tonnages in the aggregate if the price, by subsidy or otherwise, is made high enough to warrant operation.

(4) Concentration and nodulizing have been successfully developed and probably are applicable to some of the larger low-grade deposits. In respect to these, both higher market prices and some kind of financial assistance from the Government to provide plant may be essential.

(5) Still another recourse may be utilization of inferior ore to make lower-grade ferromanganese or spiegeleisen for use in the steel furnaces. If the necessity arose the metallurgists could be depended upon to solve the technical problems, though the cost of producing steel probably would be increased.

(6) In the meantime the Metals Reserve Corporation should follow the advice given to the Federal Government by mining engineers years ago and accumulate all the manganese ore of ferro-grade it can lay its hands on during the next year.


Case History
Here is an interesting story—a story of big savings and big results under difficult metal-cleaning conditions.
A company cleaned a wide variety of jobbing parts which came from several sources and were fabricated with different drawing compounds.
The cleaning bath has been operating two months with water of 32.6 grains of hardness.
To date, under heavy production, 1,335,578 square feet (one side) have already been cleaned at a cost of only 28.6¢ per thousand square feet.
The cleaning material is a Wyandotte compound. Your Wyandotte Service Representative will be glad to show you the Wyandotte way to new results.
Write us today.
Wyandotte
SERVICE REPRESENTATIVES IN 88 CITIES
THE J·B·FORD SALES CO·
WYANDOTTE MICH·

Metals Reserve to Buy 180,000 Tons of Manganese

Pittsburgh

• • • **Newalpitt Corp.** with offices here and mines in southern New Mexico, will supply the Metals Reserve Co. with 180,000 gross tons of manganese from New Mexico mines.

According to E. O. Berger, secretary of the Newalpitt company, present plans call for storing the manganese near Deming, N. M. He said the value of the order is estimated at between five and seven million dollars.

As soon as two reduction plants have been constructed near the company's mines in Southern New Mexico, work will be started on a larger scale.

'39 FERROMANGANESE, SPIEGELEISEN OUTPUT UNDER '37

Washington

• • • **Ferromanganese** and spiegeleisen production last year totaled 412,612 gross tons, valued at $27,545,156, compared with an output of 522,093 tons, valued at $36,950,540 in 1937, according to the Bureau of the Census. There were 12 producers last year and nine in 1937. Thirteen establishments produced 293,631 tons of ferrosilicon, valued at $13,217,516, in 1939, compared with production by the same number of establishments of 314,866 tons, valued at $16,042,138 in 1937.

The total production of ferroalloys by 36 establishments last year was 783,615 tons, valued at $63,738,321, compared with 981,652 tons, valued at $82,642,123, produced by 33 establishments in 1937. These establishments consisted of 13 blast and 23 electric furnaces in 1939 compared with 11 blast and 22 electric furnaces in the earlier year. Ferroalloys made in electric furnaces are classified in the chemical industry, whereas those produced in blast furnaces are classified in the blast furnace industry.

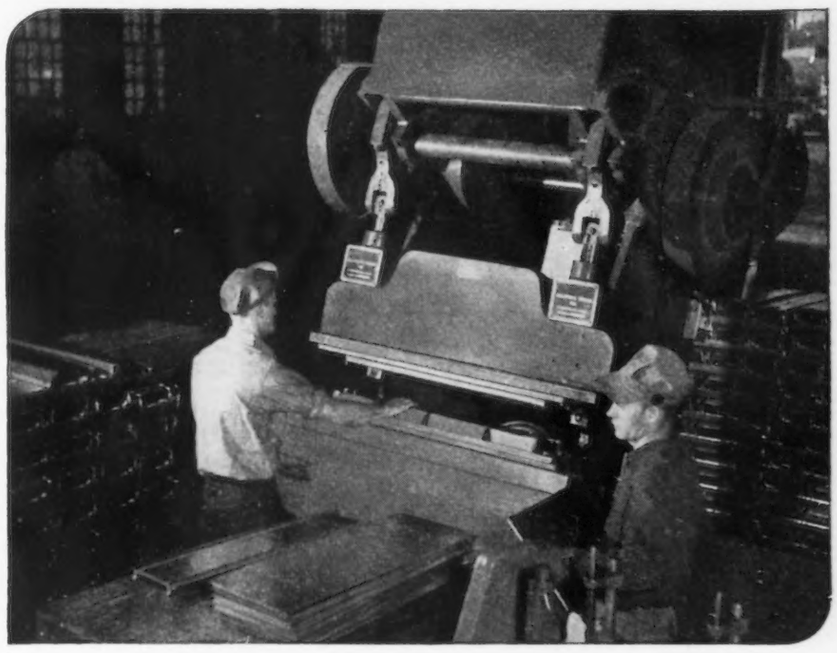
• • • **Reflecting war** conditions and domestic defense preparations, the output of aircraft and parts, including engines, rose 86.7 per cent in 1939 to $279,496,844 over the $149,699,756 reported for 1937.

This industry, as constituted for census purposes, includes establishments primarily engaged in the manufacture of complete aircraft, both heavier-than-air and lighter-than-air, including gliders, balloons, and parachutes. This industry also includes the manufacture of parts especially designed for aircraft, such as aircraft engines, propellers, propeller blades, and pontoons. The total value of products for the industry includes some duplication due to the fact that the products of establishments engaged in the manufacture of parts are to some extent used by other establishments in the industry in the manufacture of subassemblies and complete aircraft. To hold this duplication to a minimum, manufacturers of complete aircraft were requested to exclude from the reported values of the aircraft the cost of the engines, propellers, and power-plant accessories, and the values of these items, therefore, are not duplicated in the total value of products of the industry.

The wage earners, primarily engaged in manufacturing, employed in this industry in 1939 numbered 48,637, an increase of 60.1 per cent over 30,384 reported for 1937, and their wages, $77,488,188, exceeded the 1937 figures, $43,826,910, by 76.8 per cent.

Aluminum products to the value of $169,819,269 were produced in

HAVE YOU TRIED ZINCGRIP?



ARMCO ZINCGRIP takes this severe stamping job in stride. There's no flaking or peeling of the zinc on these door slats for grain bins.

• If you use galvanized metal in your products here's a sales-boosting cost-saving tip for the new year: ARMCO ZINCGRIP sheets or coils.

You'll find that this new kind of galvanized sheet can "take it" in severe forming and even moderate cold drawing operations. The zinc coating clings firmly to the base metal without peeling or flaking.

By using ZINCGRIP coils you can fabricate the metal easier and at less cost, speed operations, reduce your inventory of stock sizes and cut down scrap losses. You have a choice of three base metals: open-hearth steel, copper-bearing steel or extra-durable ARMCO Ingot Iron.

Then too you'll find ARMCO ZINCGRIP will give you some convincing talking points for those hard-to-sell prospects. Just tell us what you make or plan to make. Write The American Rolling Mill Company, 340 Curtis St., Middletown, Ohio. District Offices in Principal Cities.

ARMCO ZINCGRIP SHEETS
GIVE FULL PROTECTION

1939. This was an increase of 31.6 per cent over the value of $129,051,643 reported for 1937. The products include rolling, drawing and extruding material. Output of rough castings produced for sale in 1939 amounted to 63,741,383 lb., valued at $27,670,554, compared with 46,629,634 lb., valued at $20,998,938, while production of die castings last year was valued at $8,850,818 against $6,168,031.

Production of aluminum ware, except electrical appliances, was valued at $37,124,898 in 1939, an increase of 1.5 per cent compared with $36,591,632 reported for 1937.

Decreasing 18.6 per cent the 1939 production value of generating, distribution and industrial apparatus and apparatus for incorporation in manufactured products was $470,462,442, compared with $577,685,052 for 1937.

PROFIT with a DETROIT
Rocking Electric Furnace

- **Faster Melting.**
- **Lower Metal Losses.**
- **Higher Average Quality of Product.**
- **Less Machine-Shop Scrap.**
- **Saving in Floor Space and Molding Equipment.**
- **Use of Cheaper Raw Materials.**
- **Less Labor.**
- **Saving of Alloys.**

In brief, the **DETROIT** Electric Furnace produces a better product faster at lower cost. But don't take our word for the unusual economy and advantages of this remarkable Furnace. Find out for yourself. We shall be glad to give you the names of a great many outstanding owners. Or better still let us arrange for you to see a few of these furnaces and talk to their owners and operators yourself. **Get the low-down first hand from those who know.** Write for further facts today.

DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN

Farm Equipment Earnings 4.96%

Washington

• • • **Nine manufacturers** of agricultural machinery and tractors realized a 1939 net income of $32,517,359, after provision for payment of income taxes, or a return of 4.96 per cent on the ledger value of the corporate net worth, or stockholders' equity, according to a Federal Trade Commission report.

The nine manufacturers reported combined sales last year aggregating $529,356,946, or slightly more than 93.7 per cent of the total value of products reported for the industry by the Bureau of the Census for 1937. Of the total sales $399,667,329 or 75.5 per cent represented domestic sales and $129,689,617 or 24.5 per cent represented exports.

The report said that the 1939 combined net income of the nine manufacturers, before deduction of interest on long term borrowings and income taxes on the total capital of $689,550,719, was $42,191,588, or a rate of return of 6.1 per cent on the average of the total employed capital. The average rate of return was said to have presented individual rates ranging from 1.2 per cent to 16.5 per cent. Three of the nine corporations, the report stated, showed rates of return higher than the average, which ranged from 7.5 per cent to 16.5 per cent.

"Cash dividends paid by the nine corporations during the year 1939 amounted to $24,336,980, and this amount represented a return of slightly over 3.7 per cent to the stockholders on the average ledger value of their equity (not market value) amounting to $655,042,010.

"The operating ratios for seven of the manufacturing corporations for their 1939 operations show the cost of goods sold (exclusive of taxes, social security and pension fund payments, research and development expenses, selling and administrative expenses, and so forth) represented 72.9c. on every dollar of sales.

$119,870,920 Engine Order to Wright

Washington

• • • A $119,870,920 contract for airplane engines has been awarded by the War Department to the Wright Aeronautical Corp., Paterson, N. J. Although placed by the Army, part of the order is allocated to the Navy under the Aug. 20 announcement that government policy will be for the Army to deal exclusively with the company for the combined Army and Navy requirements of Wright engines.

National Steel Earns $3,827,311 for Quarter

Pittsburgh

• • • National Steel Corp. reports net earnings for the quarter ended Sept. 30 of $3,827,311, equal to $1.74 a share on outstanding capital stock, compared with net earnings of $2,903,881 or $1.32 a share in the corresponding 1939 period.

Net earnings are after all usual charges plus an additional charge in the amount of $434,232 to adjust federal income tax accrual for the first nine months of 1940 in accordance with the higher rates established by the Second Revenue Act of 1940.

Net earnings for the nine months ended Sept. 30 were $10,841,128, equal to $4.92 a share, compared with net profit of $7,289,305 or $3.31 a share, for the first nine months of 1939.

Kohler Foundation Formed by Kohlers

Kohler, Wis.

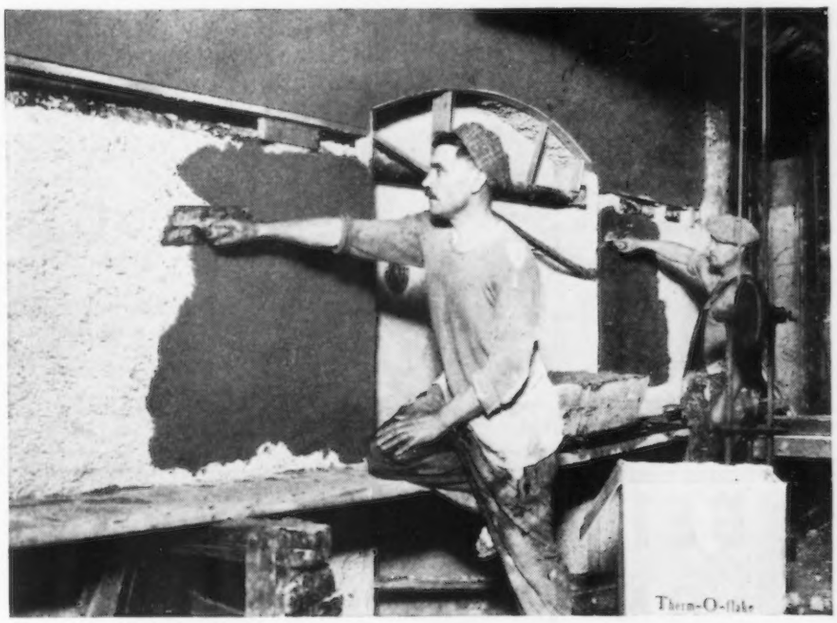
• • • The Kohler Foundation has filed incorporation papers with the Wisconsin secretary of state and will have headquarters at Kohler. It is designated as a non-profit, non-stock organization and has as its purpose a broad charitable program involving aid to the aged, orphans, infirm, students, victims of floods, famine, epidemics, tornado and other national catastrophies. Organizers are Evangeline Kohler, Marie C. Kohler, Lillie B. Kohler, O. A. Kroos, all of Sheboygan, and Herbert V. Kohler of Kohler.

20th Anniversary for Ferro Enamel Corp.

Cleveland

• • • Ferro Enamel Corp., manufacturers of inorganic and organic finishes, colors, porcelain enameling furnaces, ovens and allied products, has announced its twentieth anniversary through a leaflet being distributed and signed by Robert A. Weaver, president.

Pictures in the leaflet show the company's 1920 and 1940 plants. A chart tells that shipments of Ferro porcelain enamels have increased from 59,000 lb. in 1920 to an estimated 59,000,000 lb. in 1940. Furnace installations made in twenty years total 80 continuous and 500 box-type furnaces. Also included are illustrations and brief histories of Ferro's foreign plants, of which there are seven.



Therm-O-flake COATING

SUPERIOR HIGH TEMPERATURE INSULATION

Keeps heat inside, with a coating of plastic insulation.

One inch thickness equivalent to about nine inches of fire brick wall in insulation value.

More economical in cost and installation, on existing furnaces, than walls of insulation brick.

Easily applied and largely reclaimable for re-use, after removal.

Most widely used material for high temperature insulation, up to 2000°F.

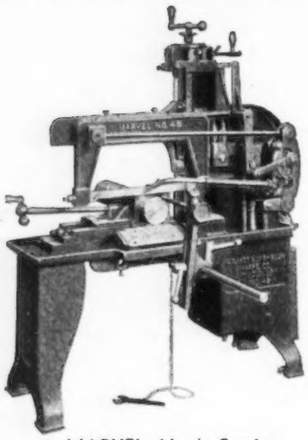
•

Write for Information and Prices

Other Therm-O-Flake Products
Made from Exfoliated Vermiculite
Granules, Brick, Block, Concrete

Illinois Clay Products Company
JOLIET, ILL.

MARVEL SAWS



- For cutting-off metal at high speeds this MARVEL No. 4B machine has no equal in its price class. Saw frame slide moves on ball-bearings and fast cutting speed is developed through quick return of non-cutting stroke. Power feed is by means of friction screw with hand screw feed also provided. Lubrication is by efficient plunger type pump.

The MARVEL No. 4B Hack Saws have a capacity 6"x6" and may be had belt-driven single speed (as illustrated) or motor driven in 2 and 4 speed models with cabinet style bases.

- MARVEL Hack Sawing machines are made in sizes and capacities for every industrial requirement.
Write for catalog.

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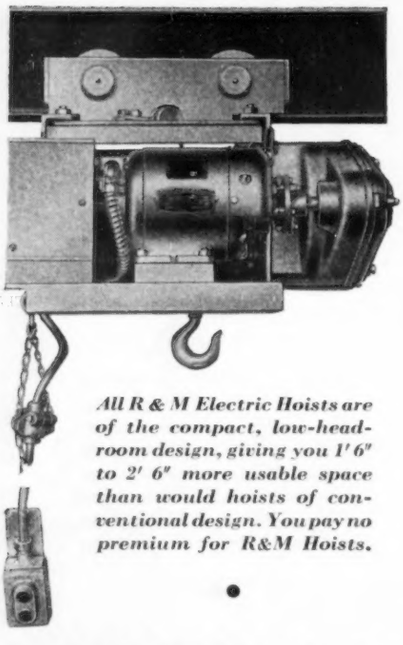

All R & M Electric Hoists are of the compact, low-headroom design, giving you 1' 6" to 2' 6" more usable space than would hoists of conventional design. You pay no premium for R&M Hoists.

If you have a hoisting problem we'd like to talk it over with you. An experienced "outsider" can often provide the fresh slant that points to a simple, profitable solution.

For instance, you may have an involved puzzle—one that our engineers could solve for you by designing special equipment as we have done time after time for all types of businesses. Or, the simple installation of a standard R&M all-steel, low-headroom hoist may provide the answer. This particular hoist, one of nearly 2,000 "stock" R&M models, can be had in 1-ton capacity, to make a 20-foot lift in 30 seconds, or 2-ton capacity that lifts the same distance in one minute flat. Both are available with plain or motor-driven trolley and push-button control.

In any case, let's talk over your hoisting problems, with no obligation on your part, of course. Our different point of view may permit us to make a valuable contribution. Write a letter today, to:

ROBBINS & MYERS, Inc.

HOIST & CRANE DIVISION • SPRINGFIELD, OHIO

Steel Exports Off 6% in September

• • • **United States exports** of iron and steel (scrap excepted) declined 7.7 per cent in quantity and 6 per cent in value in September as compared with the record August trade preliminary figures released by the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce reveal. September shipments, larger than those of any other month except August, totaled 965,444 gross tons valued at $50,630,630 as compared with the 1,046,084 tons valued at $53,870,693 exported in August and with the 244,933-ton, $11,142,216 trade of September, 1939.

Over the first nine months of 1940 exports of iron and steel have totaled 5,489,951 tons valued at $340,983,531—more than three and one-half times as much by weight and over three times as valuable as the trade of the January-September period of 1939—1,516,988 tons valued at $111,268,825.

As stated in THE IRON AGE of Oct. 31, page 85, exports of non-alloy raw and semi-finished steel in September of the present year totaled 353,448 tons, constituting, as in several previous months, the heaviest outgoing movement.

Roughly three-fifths of the September exports (607,931 tons) were dispatched to the United Kingdom whose takings, in addition to the items listed above, included 36,323 tons of alloy ingots, blooms, etc., 34,068 tons of non-alloy "other" plates, 27,636 tons of wire rods, 22,398 tons of non-alloy "other" steel bars, and 17,970 tons of heavy rails. Second ranking purchaser was Canada — 105,933 tons — followed by Japan, 54,845 tons, and the Union of South Africa, 34,255 tons.

Exports of scrap declined 100,000 tons in September as compared with August. Exports in the earlier month had totaled 355,991 gross tons valued at $6,078,241, but in the later month they amounted to only 255,608 tons valued at $4,437,019. In September, 1939, this trade had amounted to 330,680 tons valued at $5,100,069.

Cumulative nine months' exports are reported at 2,419,833 tons valued at $41,103,194 against the 2,761,594 tons valued at $40,842,079 exported in the January-September period of 1939.

More Steel Is Exported After Scrap Restrictions

• • • **Because new steel** can be more quickly converted into munitions and civilian products, foreign buyers are now taking out four tons of new steel to every ton of scrap, according to Edwin C. Barringer, executive secretary of the Institute of Scrap Iron & Steel Inc., New York.

"Since Oct. 15, when restrictions were imposed upon some exports of scrap, the spread of new steel over scrap has widened," said Mr. Barringer.

From 1919 to 1932 inclusive, according to Mr. Barringer, American exports of new steel totaled 30,805,836 tons, and scrap only 2,734,737 tons.

But in 1933, as the world began recovering from the depression, foreign steel producers discovered the economy of American scrap, with the result that from 1933 to 1939 the outward movement of scrap was 17,181,519 tons, compared with 12,020,183 tons of new steel.

However, with the outbreak of war, foreign nations reverted to new iron and steel, resulting in a demand in the first nine months of this year for 5,845,942 tons of new material, and only 2,419,833 tons of scrap.

$106,125,396 Plane Order Given By Navy to Martin

Washington

• • • **A $106,125,396** order for an undisclosed number of aircraft to be built by Glenn L. Martin Co., Baltimore, last week brought the total value of contracts announced by the Navy to $153,228,291.

Editorial Position Open

A job in editorial work (in New York City) is open for a young man who has the desire and the ability to write. Background of engineering, metallurgical or statistical education and training would be an asset. In answering state experience and qualifications fully, also salary received in present or previous position. Address, Editor, The Iron Age, 100 East 42nd Street, New York.

THE OHIO STEEL FOUNDRY COMPANY
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Carey BONDED
BUILT-UP ROOF
THE OHIO STEEL FOUNDRY CO

THE offices, power house and open hearth buildings of the Ohio Steel Foundry Company, Lima, Ohio, long have had the protection of CAREY Bonded Built-up Roofs.

Knowing the superior service these roofs are giving, it was logical that the company should choose a weather-defying CAREY Roof for its new roll and machine shop building. The roof was applied by the Asbestos Roofing & Sheet Metal Company of Lima. It is bonded to give twenty years of repair-free, trouble-free service.

CAREY Roofs today are protecting hundreds of millions of dollars invested in plants and equipment throughout the country. They must be right—both as to dependability and economy. End roofing troubles—make sure your next roof is a CAREY Roof. Write for book, "Master Specifications for Built-up Roofs"—address Department 26.

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THE PHILIP CAREY COMPANY • Lockland, Cincinnati, Ohio
Dependable Products Since 1873
BRANCHES IN PRINCIPAL CITIES

Henderson Sees Pig Iron Prices Unchanged

Washington

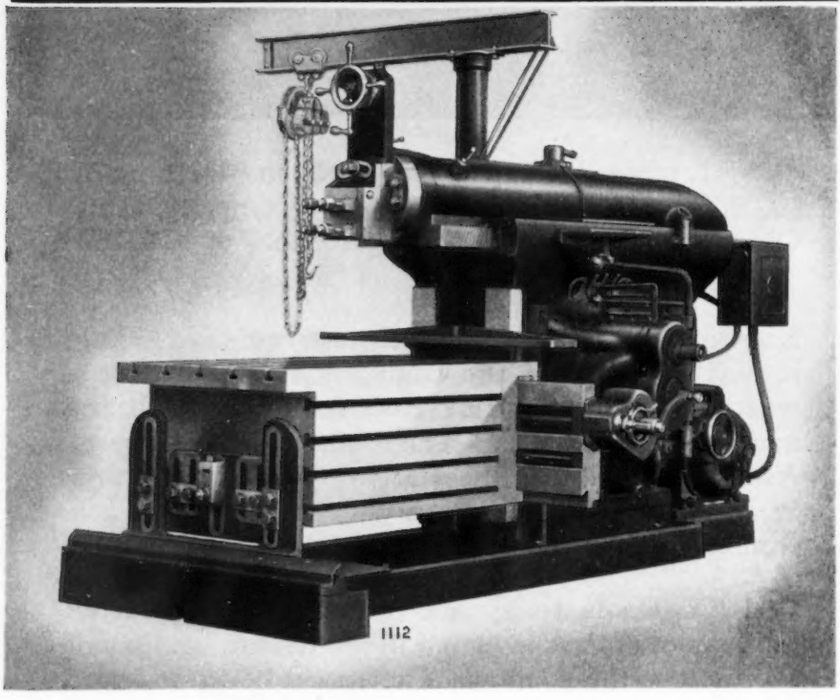
• • • **Separate conferences** he held last week with several of the leading pig iron producers and with producers of coke has convinced Leon Henderson, head of the Price Stabilization Division of the National Defense Advisory Commission, that a continuing supply of pig iron will be available at about the price which has prevailed in recent months and that substantially larger quantities of coke will be available for sale within the next few months without any increase in price. Mr. Henderson told THE IRON AGE that prospects of greater production of coke referred to beehive oven capacity in the Connellsville, Pa., district.

In a prepared statement, Mr. Henderson said that in canvassing the pig iron supply and price situation with blast furnace interests, it becomes evident that the change in price posted recently by one producer was occasioned by special local conditions.

"The pig iron situation is closely related to that of iron and steel scrap," the statement said. "Commissioner Henderson is continuing studies of supplies and prices of these two basic commodities. He will continue to confer from time to time with representatives of the trades most directly affected—iron and steel scrap dealers, pig iron producers, producers of iron and steel scrap, and the industries which are the principal consumers of these industries."

OHIO

"Super-Dreadnaught"



The OHIO 36" SUPER-DREADNAUGHT Shaper has the power and capacity required for the severe service of machining die blocks, steel forgings and large castings.
Table size—30" wide x 49" long.
Ram bearing—56" long x 15" wide.
Ram—80" long.
Can be equipped with drop table and all other attachments.

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KENTON, OHIO
MANUFACTURERS OF
SHAPERS .. OHIO DREADNAUGHT .. PLANERS
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Electric Auto-Lite Buys Own 8-Passenger Plane

Toledo

• • • **For speedier** transportation between cities in which it has important plants the Electric Auto-Lite Co. here has ordered a new $60,000 twin-engined Beechcraft plane capable of carrying eight passengers at cruising speed of 220 miles per hr.

THIRD QUARTER STEEL

	Third Quarter, 1940
Acme Steel Co.	$602,688
Alan Wood Steel Co.	318,938
Allegheny Ludlum Steel Corp.	1,300,582
American Rolling Mill Co.	1,804,511
Bethlehem Steel Corp.	12,462,288
Continental Steel Corp.	139,312
Copperweld Steel Co.	277,422
Colorado Fuel & Iron Corp.	161,702*
Follansbee Steel Corp.	33,298*
Inland Steel Co.	4,918,818
Granite City Steel Co.	51,635
Jones & Laughlin Steel Corp.	2,956,647
Keystone Steel & Wire Co.	280,409
Midland Steel Products Co.	260,166
National Steel Corp.	3,827,310
Otis Steel Co.	464,665
Republic Steel Corp.	6,183,880
Rustless Iron & Steel Corp.	321,588
Sharon Steel Corp.	365,975
Superior Steel Corp.	75,776
United States Steel Corp.	33,103,067
Wheeling Steel Corp.	1,611,108
Wickwire-Spencer Steel Co.	125,861
Universal-Cyclops Steel Corp.	287,432

*Loss. †12 months. ** New company.

Naval Construction Contracts Are Awarded

Washington

• • • **Naval construction** contracts totaling $3,412,182 were announced last week by the Navy Department. Largest contract went to Harwood-Nebel Construction Co., Washington, D. C., for additional ammunition facilities and low cost housing units at the naval powder factory, Indian Head, Md. The projects will cost $1,945,400.

Other contracts included a $750,000 order for aviation facilities at the Naval Reserve Aviation base, Atlanta, given the Mion Construction Co., Washington, contract awarded the Leonard Construction Co., Chicago, for housing facilities at the Naval Training Station, Great Lakes, Ill.

Sharon Steel to Install New 4-High Cold Mill

Youngstown

• • • **Sharon Steel Corp.** is to install a new four-high reversing cold mill and other improvements to be completed during the first quarter of 1941. The company has also made public that it will install a 20-ton electric furnace at its Lowellville, Ohio, plant (IRON AGE, Oct. 3, p. 73).

A. W. S. Sponsors Lectures On Welding at Brooklyn

• • • **Beginning Tuesday,** Nov. 19, and running through March 4, 1941, there is to be given at the Polytechnic Institute of Brooklyn a series of 10 lectures on the fundamentals of welding metallurgy, the fifth to be presented annually by the New York section of the American Welding Society. As in previous years, the lecturers will be Prof. Otto H. Henry, associate professor of metallurgy, Polytechnic Institute, and Dr. G. E. Claussen, secretary of the fundamental research division of the Welding Research Committee. A bound volume of the notes of the lectures will comprise the text. A charge of $5 is being made to non-members, $2 to members of the A.W.S. Registration is being made through George Schneider, 1065 Atlantic Avenue, Brooklyn.

EARNINGS ABOVE '39

Second Quarter, 1940	Third Quarter, 1939	Nine Months, 1940	Nine Months, 1939
$661,150	$443,184	$2,520,598†	$1,245,551†
224,313	124,585	840,497	388,839
1,008,121	327,772	3,193,873	682,094
1,079,405	600,793	3,889,110	2,269,944
10,807,318	5,377,470	34,160,745	11,609,456
141,339	198,138	492,106	730,445
293,627	219,129	798,736	610,549
394,106	231,282	797,331	1,094,506
**	**	**	**
2,873,655	2,587,750	9,888,484	6,372,810
7,238	53,953	102,025	88,999
2,141,645	1,129,001	6,232,903	281,189
.....	273,922	.....	.....
493,442	248,266	1,351,290	1,265,643
15,210,029†	2,903,881	10,841,127	7,289,304
196,629*	184,517*	102,523	435,958*
3,337,730	2,815,339	12,633,333	3,898,650
254,754	262,045	824,190	645,028
79,327	59,484	754,878	.....
31,661	29,303	191,447	31,472*
19,201,008	28,247,189	69,418,070	62,897,090
1,019,426	1,504,647	3,275,186	3,043,303
177,471*	52,661*	314,310*	360,514*
628,101	199,676	749,778	447,412

PARISH STAMPINGS *Travel Light*

CARLINE BRACKET — Used for connection between side posts and roof carlines in body frame construction of present type trailers.

Buses, trailers, railroad cars, and all transportation units, earn dividends through light weight construction. This is made possible by using high strength, corrosion resistance stampings.

To witness:—These brackets made by Parish are of .050" Ga. and 3/16" High Tensile Steel. They bring sturdy endurance, increased pay-load capacity to trailers.

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READING, PENNA.

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San Francisco, California

SPRING BRACKET — For trailer, made of several pressed steel plates welded to form the assembly shown. Lighter and Stronger

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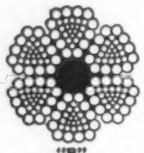
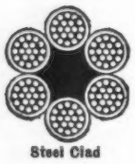

"B" Flattened Strand

Wire Rope Center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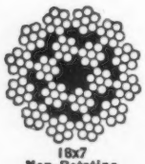
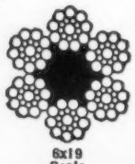
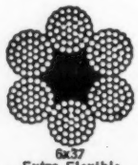

18x7 Non-Rotating

6x19 Filler Wire


6x19 Seale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Aluminum Ingot Price to Drop Nov. 18

Pittsburgh

• • • **The Aluminum Co.** of America on Nov. 18 will reduce the price of aluminum ingots to 17c. a lb., a reduction of 1c. a lb. This will be the lowest level of aluminum prices ever established by the company and makes the third reduction, each of 1c., this year.

Larger production and research as well as improved facilities were said to be the reasons for the latest reduction, and the action is in line with the policy of the company in lowering its prices whenever possible.

The Aluminum Co.'s output of aluminum will be in excess of 700,000,000 lb. in 1942, more than double its production in 1939, and fabricating facilities are being correspondingly increased. This expansion involves expenditures of more than $150,000,000 to be financed by the company itself. The extensive program is designed to make its facilities useful to meet the requirements of national defense.

Armco to Install New 4-High, 54-In. Cold Mill

Middletown, Ohio

• • • **American Rolling Mill Co.** here has awarded a contract for a four-stand 4-high 54-in. cold reduction mill to Mesta Machine Co., Pittsburgh. Surface Combustion Corp., Toledo, Ohio, has been awarded a contract for new soaking pit construction here by American Rolling Mill. F. H. McGraw Co., Middletown contractor, was awarded the construction contract for the improvement project.

Giddings & Lewis Plans New $2,000,000 Plant

Fond du Lac, Wis.

• • • **Giddings & Lewis Machine Tool Co.** is negotiating through H. B. Kraut, president, with the government for the construction with federal aid of a new plant to cost about $2,000,000. The firm already has received a number of national defense orders and is far behind in its current production. The new plant will need an added working force of several hundred employees.

U. S. Seeks Bids on Sinks, Refrigerators, Bathtubs

Washington

• • • **Proposing to turn** to large scale use of steel equipment under the Lanham $150,000,000 National Defense Housing Act, the Procurement Division, Treasury Department, has asked manufacturers for bids to be submitted by Nov. 12 on 13,000 units each of such equipment as refrigerators, sinks, bathtubs, cabinets, boilers, stoves and other heating appliances. In all there are to be 25 items bought.

Prices are to be quoted on lots of 1000 f.o.b. factory. Awards are to be made on a negotiated basis if prices are satisfactory. Should the quotations prove acceptable, the program, which is under the direction of the Public Buildings Administration, will be expanded to 25,000 units of the various equipment items and subsequently to a total of perhaps 50,000 units.

Rail Equipment Exports Set Five-Year Record

Washington

• • • **Railroad equipment** exports worth $1,438,177, the highest for any September in five years, is reported by the Commerce Department. Shipments for the first nine months of 1940 also exceeded exports for the same period last year, increasing from $5,993,521 to $14,133,756.

September shipments this year, including locomotives and parts, rolling stock and parts, railway signals, car heating equipment and air-brake equipment, consisted of two electric locomotives worth $47,388 for the Netherlands West Indies; three steam locomotives worth $174,000 for Japan; and three diesel locomotives valued at $139,228 for Panama.

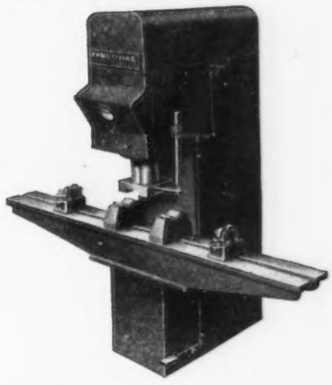
Foundry Equipment Company Enlarges South Bend Plant

• • • **American Foundry** Equipment Co., South Bend, Ind., has awarded contracts for enlarging a building housing its steel assembly department and for expanding its office building at 400 South Byrkit Avenue, South Bend.

FARQUHAR HYDRAULIC PRESSES

Reduce Straightening Costs

Farquhar Hydraulic Presses offer an opportunity to reduce the costs of difficult straightening operations in your plant. The 135-ton self contained straightening press illustrated is equipped with remote pressure regulator and adjustable speed control. It has solid V-type pressure blocks and adjustable roller stands. Its bed is 12′ x 16″. Bed to ram, 24″. Center of ram to face of frame, 10″. Stroke, 12″.



Farquhar builds hydraulic presses for stamping, forming, forging, bending, drawing and straightening. Farquhar engineers can design the right press for your requirements. Call on them.

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The correct and most efficient working pressure for each air operated machine means better performance and economical use of air power. Hannifin piston type pressure regulating valves are instantly adjustable, accurate, and dependable — for use with any type of air operated equipment.

Write for Valve Bulletin 34-A.

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HANNIFIN *Pressure* REGULATING VALVES

Government Contracts

• • • **Government** contracts announced by the Division of Public Contracts, Department of Labor, for the week ended Oct. 26, follow:

Iron and Steel Products

Manning, Maxwell & Moore, Inc., Bridgeport, Conn., valves, $14,784.
Allegheny Ludlum Steel Corp., Brackenridge, Pa., steel, $34,494.
Struthers Wells-Titusville Corp., Titusville Forge Div., Titusville, Pa., forgings, $184,295.
Camden Forge Co., Camden, N. J., forgings, $116,893.
Carnegie-Illinois Steel Corp., Washington, sheet piling, $34,591.
Baldt Anchor Chain & Forge Corp., Chester, Pa., anchor chain, $53,877.
The Midvale Co., Washington, forgings, $220,640.
Aerial Machine & Tool Corp., New York, forgings and castings, $62,200.
Samuel Levine, New York, iron unions, $15,698.
Bolt and Nut Div., Republic Steel Corp., Cleveland, bolts and nuts, $31,607.
The Kennedy Valve Mfg. Co., Elmira, N. Y., pipe fittings, $17,656.
John A. Roebling's Sons Co., Trenton, N. J., wire cloth, $20,915.
The Portland Co., Portland, Me., anchors, $11,210.
Oliver Iron & Steel Corp., Pittsburgh, nose plugs, $58,991.
National Tube Co., Pittsburgh, body forgings, $264,147.
Lansdowne Steel & Iron Co., Morton, Pa., body forgings, $176,640.
Wright Aeronautical Corp., Paterson, N. J., tools, $10,989.
Goodman Mfg. Co., Chicago, yokes, $81,965.
Titeflex Metal Hose Co., Newark, N. J., ignition harness, $41,250.
Washburn Wire Co., New York, steel, $21,766.
The Timken Roller Bearing Co., Steel and Tube Div., Canton, Ohio, steel, $11,269.
A. J. Ulmer, New York, adapter, $21,228.
Lynchburg Foundry Co., Lynchburg, Va., water pipe, $13,010.
Southern Pipe & Casing Co., Azusa, Cal., steel pipe, $35,889.
Pennsylvania Forge Corp., Philadelphia, forgings, $267,641.
Erie Forge Co., Erie, Pa., forgings, $1,162,366.
National Forge & Ordnance Co., Washington, D. C., forgings, $1,006,003.
Crucible Steel Co. of America, New York, forgings, $2,332,343.
Carnegie-Illinois Steel Corp., Boston, Mass., steel sheet, $11,304.
Bethlehem Steel Co., Bethlehem, Pa., tees, $11,447.
Mahr Mfg. Co., Minneapolis, furnaces, $26,233.
Carnegie-Illinois Steel Corp., Washington, I-beams, $419,000.
The Midvale Co., Washington, D. C., forgings, $395,513.
National Malleable & Steel Casting Co., Cleveland, steel chain, $26,880.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., nuts, $19,813.
Walworth Co., New York, pipe fittings, $37,600.
Crane Co., Washington, D. C., bends, fittings, $10,668.
U. S. Pipe & Foundry Co., Philadelphia, water pipe, $16,000.
Midland Structural Steel Co., Cicero, Ill., fabricated steel, $49,801.
Inland Steel Co., Chicago, Ill., sheet piling, $30,528.
Bethlehem Steel Co., Bethlehem, Pa., superstructures, $85,810.
Dravo Corp., Pittsburgh, floor gratings, $11,742.
The Cleveland Pneumatic Tool Co., Cleveland, forceps and holders, $19,462.
John Roebling's Sons Co., Trenton, N. J., wire, $20,958.
Peco Mfg. Corp., Philadelphia, machining forgings, $40,000.
Atlantic Mfg. Co., Philadelphia, projectile, dummy, $33,504.
Lundquist Tool & Mfg. Co., Worcester, Mass., telescope mounts, $28,798.
Harrisburg Steel Corp., Harrisburg, Pa., demolition bombs, $265,000.
Doehler Die Casting Co., Pottstown, Pa., booster cups, $70,428.
Federal Screw Works, Detroit, Mich., booster parts, $560,774.
Mitchell Metal Products, Inc., Cleveland, metal crates, $45,400.
Zimmerman Steel Co., Bettendorf, Iowa, steel castings, indefinite.
Republic Steel Corp., Massillon, Ohio, steel, $59,805.
A. Finkl & Sons Co., Chicago, forgings, $94,250.
J. R. Hunt & Co., Baltimore, tubes, $23,610.
Wackman Welded Ware Co., St. Louis, steel drums, $53,783.
Standard Gas Equipment Corp., Baltimore, gas ranges, $102,550.
American Stove Co., Cleveland, gas ranges, $95,654.
Majestic Mfg. Co., St. Louis, Mo., gas ranges, $310,971.
Carnegie-Illinois Steel Corp., Birmingham, Ala., steel piling, $14,400.

Non-Ferrous Metals and Alloys

The American Brass Co., Waterbury, Conn., jacket cups, $111,031.
Bridgeport Brass Co., Bridgeport, Conn., cartridge cases, $364,965.
American Brass Co., Waterbury, Conn., rotating bands, $41,287.
Oneida, Ltd., Oneida, N. Y., tableware, $25,712.
Elite Specialty Metal Co., Inc., New York, collar insignia, $10,175.
American Metal Crafts Co., Attleboro, Mass., collar insignia, $85,575.
Aluminum Co. of America, Pittsburgh, conductor, $36,340.
Metal Reduction Corp. of N. J., North Bergen, N. J., bronze ingots, $29,670.
American Brass Co., Waterbury, Conn., cartridge cups, $71,305.
Scovill Mfg. Co., Waterbury, Conn., cartridge cups, $93,750.
Aluminum Co. of Washington, powdered magnesium, $49,776.
Scovill Mfg. Co., Waterbury, Conn., cartridge cases, $244,200.
Scovill Mfg. Co., Waterbury Conn., booster parts, $102,410.
Stewart-Warner Corp., Chicago, fuses, $865,359.
Stewart-Warner Corp., Chicago, fuse parts, $506,001.

Other Machinery

William Sellers & Co., Inc., Philadelphia, planer, $36,675.
Vandyck Churchill Co., New York, milling mchs., $40,752.
Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn., automatic mch., $21.175.
The Heald Machine Co., Worcester, Mass., grinder, $10,779.
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, Ohio, milling mch., $25,417.
National Broach & Machine Co., Detroit, milling mch., $26,316.
The Bullard Co., Bridgeport, Conn., boring mills, $299,815.
Reed-Prentice Corp., Worcester, Mass., die casting mch., $10,960.
Van Norman Machine Tool Co., Springfield, Mass., milling mchs., $10,321.
Monarch Machine Tool Co., Sidney, Ohio, lathes, $33,821.
Gardner-Denver Co., Washington, compressor plant, $14,843.
Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn., lathes, $11,003.
The Vulcan Copper & Supply Co., Cincinnati, distillation equipment, $26,200.

Chicago Pneumatic Tool Co., Philadelphia, pneumatic drills, $10,143.
Forsythe Equipment Co., Inc., Long Island City, N. Y., crane, $10,860.
The Cleveland Tractor Co., Cleveland, tractors, $86,560.
The Portland Machinery Co., Portland, Ore., engine lathe, $12,553.
McGill Mfg. Co., Washington, D. C., bearings, $16,648.
The Toledo Machine & Tool Div. of E. W. Bliss Co., Toledo, Ohio, trimming presses, $11,337.
Landis Tool Co., Waynesboro, Pa., grinding machine, $21,940.
Western Laundry Machinery Co., N. Kansas City, Mo., laundry equipment, $12,003.
American Engineering Co., Philadelphia, windlass, $517,200.
W. E. Shipley Machinery Co., Philadelphia, boring mchs., $53,565.
Vandyck Churchill Co., Philadelphia, boring mill, $50,328.
The Monarch Machine Tool Co., Sidney, Ohio, lathes, $13,475.
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, milling mchs., $52,030.
Swind Machinery Co., Philadelphia, boring mch., $29,891.
Dayton-Dowd Co., Quincy, Ill., pumping units, $16,028.
Barber-Greene Co., Aurora, Ill., conveyor machinery, $17,880.
Norton Co., Worcester, Mass., grinder, $17,333.
Landis Tool Co., Waynesboro, Pa., grinder, $13,095.
Rotary Lift Co., Memphis, Tenn., lift assy., $10,880.
Mr. Tell Berna, Cleveland, machine tools, $15,000.
New Britain-Gridley Machine Div., New British Machine Co., New Britain, Conn., screw machines, $20,882.
Jones & Lamson Machine Co., Springfield, Vt., thread grinders, $28,835.
Kingsbury Machine Tool Corp., Keene, N. H., drilling mchs., $38,593.
The Warner & Swasey Co., Cleveland, turret lathes, $15,892.
Kingsbury Machine Tool Corp., Keene, N. H., drilling mchs., $67,141.
Dana Tool-D. Nast Machinery Co., Philadelphia, twist drills, $12,923.
The Monarch Machine Tool Co., Sidney, Ohio, lathes, $33,488.
Rockford Drilling Machine Div. Borg-Warner Corp., Rockford, Ill., flywheels, $25,151.
Wilson-Brown, Inc. New York, turret lathes, $10,137.
Henry Prentiss & Co., Inc., New York, turret lathes, $26,841.
Ice Cooling Appliance Corp., Chicago, Ill., refrigerators, $233,800.
Ingersoll-Rand Co., Washington, D. C., air compressor, $11,800.

Navy Bureau of Supplies and Accounts

Chisholm-Moore Hoist Corp., Tonawanda, N. Y., chain hoists, $15,394.
The Lodge & Shipley Machine Tool Co., Cincinnati, engine lathes, $60,591.
Cuno Engineering Corp., New York, oil filters, $42,480.
H. F. Allen Co., Inc., New York, saws, band, metal cutting, $6,091.
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, grinder, centerless types, $9,348.
Thos. Somerville Co., Washigton, cocks and valves, $6,131.
The Warner & Swasey Co., Cleveland, lathes, turret, universal, $28,683.
Simmons Co., New York, tables, mess, steel, $37,091.
The Bender Body Co., Elyria, Ohio, tables, mess, steel, $42,334.
James G. Biddle Co., Philadelphia, generators, testing, $54,092.
The Midvale Co., Washington, racks and pinions, turret training gear, $239,600.
Camden Forge Co., Camden, N. J., racks and pinions, turret training gear, $240,860.
Vickers, Inc., Waterbury Tool Division, Waterbury, Conn., pumps, hydraulic, $122,203.
Hendey Machine Co., Torrington, Conn., lathes, toolmaker's, $18,086.
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, Ohio, machines, milling, $319,431.
Henry Prentiss & Co., Inc., New York, machine, boring, drilling and milling, $25,184.
Gleason Works, Rochester, N. Y., generator, gear, $10,672.
Tidewater Supply Co., Inc., Norfolk, Va., machine, hobber, gear, universal, $12,477.
Gleason Works, Rochester, N. Y., generator, gear, straight bevel, $19,003.
D. W. Onan & Sons, Minneapolis, Minn., sets, generating, electric, $18,562.
Sidney Machine Tool Co., Sidney, Ohio, lathes, engine, $12,762.
Norris Stamping & Mfg. Co., Los Angeles, boxes, ammunition, $848,812.
E. Behringer Sheet Metal Works, Inc., Newark, N. J., shells, head, steel, $56,330.
Crane Co., Washington, cocks and valves, $86,082.
Henry Prentiss & Co., Inc., New York, machines, boring, milling and drilling, $78,292.
Swind Machinery Co., Philadelphia, machines, boring, milling and drilling, $103,104.
Star Machinery Co., Seattle, Wash., machines, boring, milling and drilling, $25,715.
Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn., machine, jig boring, vertical, $12,626.
Levene Motor Co., Philadelphia, ammeters; distributors; and switches, $5,583.
Sperry Gyroscope Co., Inc., Brooklyn, N. Y., gyros, directional and horizons, $404,350.
Parker Appliance Co., Cleveland, benders, tube, $6,700.
Sharpless Corp., Philadelphia, purifiers, diesel fuel oil, $45,052.
Reed-Prentice Corp., Worcester, Mass., lathes, engine, $62,970.
Lodge & Shipley Machine Tool Co., Cincinnati, lathe, engine, $7,638.
C-O-Two Fire Equipment Co., Newark, N. J., cylinders, gas, carbon dioxide, $21,072.
American Tool Works Co., Cincinnati, lathe, engine, $9,584.
Revere Copper & Brass, Inc., Baltimore Div., Baltimore, Md., facing, boat, brass, $7,621.
Baker-Raulang Co., Cleveland, trucks, electric, crane revolving, $6,285.
Stewart-Warner Corp., Chicago, Ill., bombs, miniature practice, $23,688.
Doehler Die Casting Co., Pottstown, Pa., bombs, miniature, practice, $48,074.
Reid Avery Co., Dundalk, Baltimore, electrodes, welding, steel, $20,780.
Atlantic Metal Hose Co., Inc., New York, hose, steam, bronze, $16,575.
The American Brass Co., American Metal Hose Branch, Waterbury, Conn., hose, steam, bronze, $67,860.
United Meta Hose Co., Inc., Long Island City, N. Y., hose, steam, bronze, $23,410.
Baldt Anchor, Chain & Forge Corp., Chester, Pa., chain, dielock steel, $14,977.
National Malleable & Steel Castings Co., Cleveland, Ohio, chain, cast steel, $131,939.
Armstrong-Blum Mfg. Co., Chicago, Ill., saws, band, for metal, $5,016.
Brown & Sharpe Mfg. Co., Providence, R. I., machines, milling, $13,557.
Lukens Steel Co., Coatesville, Pa., blocks, trunnion, bearing, and caps, $64,314.
Crucible Steel Co. of America, New York, electrodes, welding, steel, $44,500.
The Hooven, Owens, Rentschler Co., Hamilton, Ohio, spare parts for main engine, $74,975.
Link Aviation Devices, Inc., Binghamton, N. Y., trainer, link, $662,044.
United Aircraft Corp. Pratt & Whitney Aircraft Division, East Hartford, Conn., engines, airplane, $3,315,845.

• **George C. Brainard,** president, General Fireproofing Co., Youngstown, and chairman of the board of the Fourth Federal Reserve District, has been named chief of the Cleveland ordnance district of the U. S. Army. He filled a similar position during the World War. Mr. Brainard will act in an advisory and consulting capacity, especially on organization of industry in the district, which covers the northern half of Ohio and parts of western Pennsylvania, including Erie.

• **Norman H. Wright** has been appointed exclusive sales representative in New England, with offices at 25 Irvington Street, Boston, for the Torrington Mfg. Co., Torrington, Conn. He succeeds the late P. M. Patterson, with whom he had been associated for some time.

• **Powell Pardee,** who has been identified with Inland Steel Co., Chicago, since 1905, has been made sales manager of the newly-opened district sales office at 40 Wall Street, New York. He was manager of the order department in Chicago from 1913 to early 1940, when he was sent to New England as special representative in connection with export business. The New York office will handle both export and domestic business in the Eastern territory.

POWELL PARDEE, New York district sales manager of Inland Steel Co.

Personals

Change is inevitable in progressive Industry. Change is constant.

• **G. B. Waterhouse,** professor of metallurgy at Massachusetts Institute of Technology, is to discuss "Strategic Material No. 1—Manganese" before the Providence section of the American Society of Mechanical Engineers on Nov. 7.

• **Stanley A. McCaskey, Jr.,** has been appointed to an executive position in Allegheny Ludlum Steel Corp., Pittsburgh. Mr. McCaskey is a graduate of the Harvard Law School and has been admitted to practice before the Pennsylvania Supreme Court and the Supreme Court of the United States.

In addition to general corporation experience with the South Penn Oil Co. and the Six States Coal Corp., Mr. McCaskey was chief counsel for the treasurer of the United States and also served in Porto Rico with the Porto Rico Reconstruction Administration.

• **Harry G. Schoene,** for the past 20 years connected with the Sherwin-Williams Co., selling production finishes to manufacturers in Ohio, Michigan, West Virginia and St. Louis territories, has been appointed sales manager of the H. Forsberg Co., Cleveland, maker of industrial production finishes. He will cover the Middle West for the company.

• **Col. W. W. Rose,** executive vice-president of the Gray Iron Founders Society, Inc., Cleveland, is to speak on "Inconsistent Sales Practices of Gray Iron Foundries" before the Philadelphia chapter of the American Foundrymen's Association at the Engineers Club, Nov. 8.

• **C. M. Gile** has been appointed to the newly-created post of general manager of refined oil sales and sales operations of the entire marketing territory of Gulf Oil Corp., Pittsburgh. The new position includes Mr. Gile's former post as general manager of northern divisions and also the southern divisions which were managed by the late H. C. Meyer.

Three assistant general managers have been named to aid Mr. Gile. They are **W. V. C. Bulkeley,** who will assist in handling Boston, New York, and Philadelphia divisions; **H. E. Benson,** who will assist in Houston, New Orleans, and Atlanta divisions; and **V. H. Ludwig** who will assist with Pittsburgh, Toledo, and Louisville divisions. Mr. Gile entered the oil business 22 years ago with the New England Oil Refining Co. and has been associated with the Gulf Oil Co.'s sales department since 1925.

• **Harry G. Morrow,** formerly vice-president and general manager of sales, Central Tube Co., Pittsburgh, has been appointed manager of sales for conduit and standard pipe by Spang Chalfant, Inc., with headquarters in the Grant Building, Pittsburgh. He was associated since 1909 with the Central Tube Co., the activities of which were discontinued early this year.

HARRY G. MORROW, manager of conduit and standard pipe sales, of Spang Chalfant, Inc.

• **G. S. Swanson,** for the past several years associated with the Pettibone-Mulliken Corp., Chicago, has been made Cleveland district sales manager of Williams clamshell and dragline buckets division of the Wellman Engineering Co., Cleveland. He was formerly employed by the G. H. Williams Co., Erie, Pa., prior to Wellman's purchase of that company's bucket division about nine years ago.

• **W. Z. Friend,** of International Nickel Co., New York, was the speaker at the recent meeting of the Milwaukee section of the American Chemical Society at the Ambassador Hotel. He talked on "Galvanic Corrosion."

• **George J. Kruse, Jr.,** heretofore forging engineer for the General Metals Corp., Houston, Tex., has been made manager of the Western Forge & Tool Works, Oakland, Cal.

• **L. S. Cope,** who has had a broad experience in the manufacturing, engineering and metallurgical fields, has been appointed development engineer for the Oliver Iron & Steel Corp., Pittsburgh.

• **M. E. Morgan,** open hearth, blast furnace and coke works superintendent at Republic Steel Corp.'s Gulfsteel plant, Gadsden, Ala., has been promoted to superintendent of blast furnaces and coke works for the Youngstown district. **George Cain,** of the Cleveland division, has been named superintendent of open hearths at Gadsden, and **W. H. Winton** has been appointed blast furnace and coke works superintendent there. Mr. Winton formerly was assistant superintendent of blast furnace and coke works at the Gulfsteel plant.

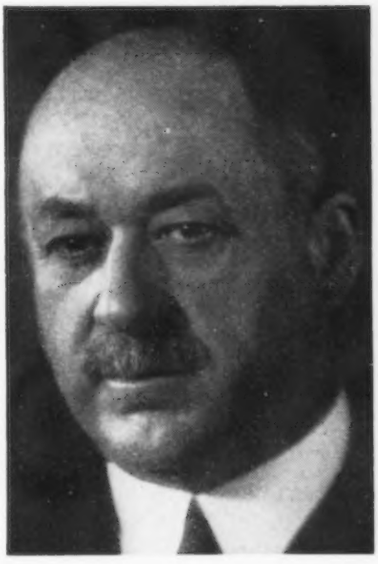
• **J. E. Urquhart,** general superintendent of operations, Woodward Iron Co., has been elected president of the Southern Blast Furnace and Raw Materials Association, succeeding **C. L. Bransford,** Birmingham district manager for Republic Steel Corp. **G. M. Harris,** assistant general superintendent of Ensley steel works, Tennessee Coal, Iron & Railroad Co., has been elected vice-president and **E. R. Merrill,** superintendent of coke works for Woodward, has been elected secretary-treasurer.

Obituary

• **William F. Rust,** for many years a resident of Pittsburgh and active in civic and industrial affairs, died at his home near Leesburg, Va., Oct. 29, aged 66 years.

Mr. Rust worked as an apprentice in the Westinghouse Electric Co., Pittsburgh, and was employed by the Jones & Laughlin Steel Corp. and the Westinghouse Machine Co., later going with the Colorado Fuel & Iron Co. In 1901 he continued his education, taking technical courses at Lehigh University, following which he was employed at the Tidewater Steel Co., Georgia Iron & Coal Co., and Columbia Iron & Steel Co. In 1906 he was employed as chief draftsman in charge of remodeling the Illinois Steel Co.'s plant, Joliet, Ill., and later as assistant chief engineer of the American Sheet & Tin Plate Co. He later was connected with the Youngstown Sheet & Tube Co.

He returned to Pittsburgh in 1915 as chief engineer of the Koppers Co., later becoming executive vice-president. Mr. Rust also was president of Alan Wood Steel Co., Eastern Gas & Fuel Associates and other affiliated companies. Several years ago he retired from active service and has since lived at his home near Leesburg.



THE LATE William F. Rust, formerly president of Alan Wood Steel Co.

• **Charles A. McCune,** research engineer and secretary of the Magnaflux Corp., New York, died in Atlantic City, N. J., on Oct. 14, aged 61 years. He was a graduate of Cooper Union and was chief draftsman of the Safety Car Heating & Lighting Co. from 1900 to 1904. For the next 12 years he was first assistant engineer and then chief engineer of the Commercial Acetylene Co. He then joined the Page Steel & Wire Co. as a sales engineer and left that company in 1924 to become director of research for the American Chain Co. In 1931 he accepted a similar post with the Welding Engineering & Research Corp. and at the time of his death had been secretary of the Magnaflux Corp. since 1932.

Mr. McCune made outstanding contributions to the acetylene and welding industries, having developed cylinders for the safe storage and transportation of acetylene, arc welding electrodes and welding wire, and non-destructive test methods. He was president of the American Welding Society in 1923 and had been treasurer of that association since then. He was also president of the International Acetylene Association in 1929 and received the Samuel Wyle Miller Memorial Medal of the American Welding Society in 1934.

• **Edward Francis Smith,** district manager of the Haynes Stellite Co., Chicago, died at Rochester, Minn., on Sept. 26, aged 52 years. He learned the practical aspects of the machinist's trade in his father's shop. He became sales engineer with the Haynes Stellite Co. in 1920 and was made Chicago district manager a few years later.

• **Herman W. Koerner,** president of the Universal Wire & Iron Co., Milwaukee, died Oct. 27 at his home in Milwaukee at the age of 79. He had been ill for about a year.

• **Samuel J. Ghilain,** superintendent of the mason department at South works of the Carnegie-Illinois Steel Corp., died Oct. 20, at South Shore Hospital, Chicago, following a heart attack. He was 56 years old and had been employed continuously at South works since 1908.

October Pig Iron Output Surpasses 1929 High Mark

PRODUCTION of coke pig iron in October reached the highest peak in the history of the industry both in total output and in daily average. Output totaled 4,445,961 net tons, compared with the previous high record of 4,365,852 net tons in May, 1929. On a daily basis production in October made a gain of 3 per cent over that in September, or from 139,218 to 143,418 tons. The operating rate for the industry was 94.8 per cent of capacity, against 92.2 per cent in September.

Output totaled 4,445,961 tons in Oct. Operating rate at 94.8 per cent of capacity

There were 195 furnaces in blast on Nov. 1, operating at the rate of 144,215 tons a day, compared with 193 on Oct. 1, making 140,620 tons. Three furnaces were blown in during the month and one was blown out for repairs. The United States Steel Corp., independent and merchant producers each blew in one furnace, and one merchant furnace was blown out.

Among the furnaces blown in were Perry, Interlake Iron Corp.; one Gary, Carnegie-Illinois Steel Corp., and one Ford Motor Co.

The only furnace blown out was North Birmingham No. 3 of the Sloss-Sheffield Steel & Iron Co., which is being repaired.

Production by Districts and Coke Furnaces in Blast
(All Figures in Net Tons)

FURNACES	(All Figures in Net Tons) Oct., 1940	Sept., 1940	Oct., 1939	Nov. 1, 1940 Number in Blast	Nov. 1, 1940 Operating Rate, Net Tons a Day	Oct. 1, 1940 Number in Blast	Oct. 1, 1940 Operating Rate, Net Tons a Day
New York:							
Buffalo	285,520	267,033	266,044	12	9,210	12	8,900
Other New York and Mass.	33,304	33,964	17,920	2	1,075	2	1,130
Pennsylvania:							
Lehigh Valley	105,902	99,018	89,674	5	3,415	5	3,075
Spiegeleisen	5,997	4,631	9,057	1	195	1	155
Schuylkill Valley	43,967	43,116	40,260	3	1,415	3	1,435
Susquehanna and Lebanon Valleys	48,629	46,489	17,106	2	1,570	2	1,550
Ferromanganese	3,125	2,972	.....	1	100	1	100
Pittsburgh District	936,886	874,763	898,212	38	30,220	38	29,660
Ferro. and Spiegel	23,074	17,601	6,162	3	745	3	585
Shenango Valley	83,156	77,949	62,528	4	2,680	4	2,600
Western Penna.	115,995	117,026	116,518	7	3,925	6	3,900
Ferro. and Spiegel	13,215	12,451	14,968	1	425	1	415
Maryland	195,299	196,348	206,820	6	6,300	6	6,545
Wheeling District	187,881	166,924	182,797	8	6,060	8	6,130
Ohio:							
Mahoning Valley	465,569	445,032	410,508	18	15,020	18	14,835
Central and Northern	379,339	361,349	355,771	16	12,235	16	12,945
Southern	52,336	50,309	64,053	4	1,690	4	1,675
Illinois and Indiana	925,209	857,234	784,732	34	30,610	33	29,140
Michigan and Minnesota	138,241	119,924	144,141	7	4,555	6	3,995
Colorado, Missouri and Utah	62,088	56,503	53,625	4	2,005	4	1,885
The South:							
Virginia	.....	.....	.....	0	....	0	....
Ferromanganese	.....	.....	3,314	0	....	0	....
Kentucky	29,338	27,865	28,821	2	945	2	930
Alabama	311,891	298,026	287,493	17	9,820	18	9,935
Ferromanganese	.....	.....	2,373	0	....	0	....
Tennessee	.....	.....	.....	0	....	0	....
Total	4,445,961	4,176,527	4,062,901	195	144,215	193	140,620

Production of Coke Pig Iron and Ferromanganese
(All Figures in Net Tons)

	Pig Iron* 1940	Pig Iron* 1939	Ferromanganese† 1940	Ferromanganese† 1939
January	4,032,022	2,436,474	43,240	23,302
February	3,311,480	2,307,409	38,720	20,894
March	3,270,499	2,681,969	46,260	17,928
April	3,137,019	2,302,918	43,384	12,900
May	3,513,683	1,923,618	44,973	8,835
June	3,818,897	2,372,665	44,631	18,611
½ year	21,083,600	14,025,053	261,208	102,470
July	4,053,945	2,639,022	43,341	23,758
August	4,238,041	2,978,991	37,003	23,103
September	4,176,527	3,223,983	33,024	24,583
October	4,445,961	4,062,901	32,270	26,817
November	.....	4,166,888	....	33,999
December	.....	4,220,536	....	40,654
Year	.....	35,317,374	....	275,384

*These totals do not include charcoal pig iron. †Included in pig iron figures.

Daily Average Production of Coke Pig Iron

	1940	% Capacity	1939	% Capacity	1938
January	130,061	85.8	78,596	51.5	51,632
February	114,189	75.1	82,407	54.0	51,931
March	105,500	68.9	86,516	56.8	52,476
April	104,567	68.6	76,764	50.4	51,376
May	113,345	74.8	62,052	40.8	45,343
June	127,297	83.9	79,089	51.7	39,648
½ year	115,844	76.1	77,486	...	48,717
July	130,772	86.3	85,130	55.8	43,417
August	136,711	90.4	96,096	62.9	53,976
September	139,218	92.2	107,466	70.4	62,737
October	143,418	94.8	131,061	85.9	74,147
November	.....	...	138,877	90.9	84,746
December	.....	...	136,146	89.4	79,872
Year	.....	...	96,760	...	57,633

Merchant Iron Made, Daily Rate

	1940	1939	1938	1937	1936
January	16,475	11,875	11,911	18,039	11,801
February	14,773	10,793	9,916	18,496	12,652
March	11,760	10,025	9,547	18,432	12,131
April	13,656	9,529	9,266	16,259	15,565
May	16,521	7,883	7,203	21,821	14,352
June	13,662	8,527	6,020	17,774	15,914
July	16,619	9,404	6,154	21,962	13,013
August	17,395	11,225	7,408	19,971	13,606
September	17,571	12,648	12,550	22,473	14,029
October	18,694	16,409	12,095	21,224	15,282
November	....	16,642	14,793	17,541	16,508
December	....	16,912	10,226	12,280	16,634

STEEL FINISHING CAPACITY USED AT 95.4% IN SEPTEMBER

Output of semi-finished and finished steel for sale in September totaled 4,446,555 net tons, including 233,824 tons sold to members of the industry for further conversion. This was equal to 95.4 per cent of the finishing capacity. Steel produced for export totaled 951,555 net tons in the month.

Divisions of the industry in which finishing capacity was operated at highest rates were: Steel piling, 94.5 per cent; sheets, 86.3 per cent; plates, 73.9 per cent; heavy structural shapes, 73 per cent; bars, 74.3 per cent. Shipments for export in the nine months ended Sept. 30 totaled 5,623,100 net tons.

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

September - 1940 (period)

		Number of companies	Items	Annual Capacity Net tons	Production for Sale—Net Tons: Current Month: Total	Current Month: Per cent of capacity	Current Month: Shipments: Export	Current Month: Shipments: To members of the industry for conversion into further finished products	To Date (9 Months 1940): Total	To Date (9 Months 1940): Per Cent of capacity	To Date (9 Months 1940): Shipments: Export	To Date (9 Months 1940): Shipments: To members of the industry for conversion into further finished products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	34	1	xxxxxxx	631,848	xxx	355,789	108,115	3,892,954	xxx	1,859,053	823,826
	Heavy structural shapes	8	2	5,205,300	310,944	73.0	55,638	xxxxxxx	2,082,099	53.4	285,530	xxxxxxx
	Steel piling	4	3	328,000	25,371	94.5	4,610	xxxxxxx	137,204	55.9	14,208	xxxxxxx
	Plates—Sheared and Universal	20	4	6,095,450	368,684	73.9	67,231	969	2,881,455	63.1	441,671	15,444
	Skelp	8	5	xxxxxxx	100,007	xxx	28,814	29,564	566,980	xxx	108,878	203,152
	Rails—Standard (over 60 lbs.)	4	6	3,647,600	79,113	26.5	24,825	xxxxxxx	1,219,854	44.7	168,451	xxxxxxx
	Light (60 lbs. and under)	6	7	306,800	13,305	53.0	9,597	xxxxxxx	86,940	37.9	32,981	xxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	118,000	1,056	10.9	21	xxxxxxx	19,098	21.6	2,403	xxxxxxx
	Splice bar and tie plates	15	9	1,300,200	29,017	27.3	387	xxxxxxx	405,278	41.6	7,396	xxxxxxx
	Bars—Merchant	35	10	xxxxxxx	453,431	xxx	130,799	30,632	3,259,688	xxx	528,292	249,839
	Concrete reinforcing—New billet	16	11	xxxxxxx	111,231	xxx	17,064	xxxxxxx	946,796	xxx	222,268	xxxxxxx
	Rerolling	18	12	xxxxxxx	12,344	xxx	1,021	xxxxxxx	108,042	xxx	6,130	xxxxxxx
	Cold finished—Carbon	18	13	xxxxxxx	60,660	xxx	2,378	xxxxxxx	482,788	xxx	12,969	xxxxxxx
	Alloy—Hot rolled	16	14	xxxxxxx	98,356	xxx	12,130	8,207	694,714	xxx	60,834	40,420
	Cold finished	15	15	xxxxxxx	8,892	xxx	676	xxxxxxx	67,709	xxx	2,648	xxxxxxx
	Hoops and baling bands	5	16	xxxxxxx	8,158	xxx	545	xxxxxxx	77,616	xxx	7,112	xxxxxxx
	TOTAL BARS	54	17	12,372,465	753,072	74.3	164,613	38,839	5,637,353	60.9	840,253	299,259
	Tool steel bars (rolled and forged)	15	18	110,220	6,270	69.5	663	xxxxxxx	50,802	61.6	4,264	xxxxxxx
	Pipe and tube—B. W.	13	19	1,851,860	107,915	71.2	6,564	xxxxxxx	758,723	54.7	57,023	xxxxxxx
	L. W.	10	20	1,246,340	29,746	29.2	3,087	xxxxxxx	256,404	27.5	26,018	xxxxxxx
	Electric weld	5	21	735,520	28,162	46.8	2,803	xxxxxxx	214,241	38.9	22,808	xxxxxxx
	Seamless	15	22	3,159,840	168,860	65.3	45,936	xxxxxxx	1,309,861	55.4	159,896	xxxxxxx
	Conduit	6	23	151,145	7,784	62.9	83	xxxxxxx	53,314	47.1	1,450	xxxxxxx
	Mechanical Tubing	13	24	554,825	28,371	62.5	3,563	xxxxxxx	206,400	49.7	16,430	xxxxxxx
	Wire rods	18	25	xxxxxxx	138,009	xxx	55,873	21,046	879,220	xxx	282,167	137,249
	Wire—Drawn	37	26	2,255,210	131,846	71.4	16,976	1,255	1,050,590	62.2	130,077	8,331
	Nails and staples	19	27	1,091,690	53,983	60.4	3,755	xxxxxxx	450,038	55.1	48,418	xxxxxxx
	Barbed and twisted	16	28	438,270	17,861	49.8	6,986	xxxxxxx	154,587	47.1	37,954	xxxxxxx
	Woven wire fence	15	29	772,790	13,503	21.3	118	xxxxxxx	176,781	30.6	1,678	xxxxxxx
	Bale ties	11	30	119,050	6,115	62.7	93	xxxxxxx	54,628	61.3	237	xxxxxxx
	All other wire products	5	31	27,030	473	21.4		xxxxxxx	3,964	19.6	-	xxxxxxx
	Fence posts	13	32	147,485	4,314	35.7	118	xxxxxxx	41,363	37.5	810	xxxxxxx
	Black plate	12	33	653,295	20,476	38.3	372	19	263,808	53.9	33,803	55,982
	Tin plate—Hot rolled	9	34	1,201,960	30,286	30.8	1,767	xxxxxxx	358,646	39.9	72,696	xxxxxxx
	Cold reduced	10	35	2,930,860	162,697	67.8	15,669	xxxxxxx	1,741,385	79.4	279,659	xxxxxxx
	Sheets—Hot rolled	26	36	xxxxxxx	530,411	xxx	45,084	17,603	4,027,356	xxx	397,588	112,893
	Galvanized	16	37	xxxxxxx	138,375	xxx	12,497	xxxxxxx	1,023,023	xxx	124,011	xxxxxxx
	Cold rolled	18	38	xxxxxxx	219,416	xxx	4,053	xxxxxxx	1,660,908	xxx	61,471	xxxxxxx
	All other	15	39	xxxxxxx	48,578	xxx	1,954	xxxxxxx	421,578	xxx	18,789	xxxxxxx
	TOTAL SHEETS	27	40	13,255,610	936,780	86.3	64,488	17,603	7,132,865	71.9	601,859	112,893
	Strip—Hot rolled	24	41	3,525,110	137,220	47.5	8,955	16,414	1,049,033	39.7	64,596	123,994
	Cold rolled	35	42	1,313,360	70,404	65.5	1,467	xxxxxxx	532,901	54.2	13,256	xxxxxxx
	Wheels (car, rolled steel)	5	43	424,385	14,603	42.0	42	xxxxxxx	138,923	43.7	2,481	xxxxxxx
	Axles	5	44	472,280	10,903	28.2	26	xxxxxxx	66,727	18.9	1,803	xxxxxxx
	Track spikes	11	45	327,275	6,434	24.0	126	xxxxxxx	80,636	32.9	2,913	xxxxxxx
	All other	3	46	9,100	1,123	150.7	-	xxxxxxx	7,935	116.5	-	xxxxxxx
	TOTAL STEEL PRODUCTS	134	47	xxxxxxx	4,446,555	xxx	951,555	233,824	33,962,990	xxx	5,623,100	1,780,130
	Estimated total steel finishing capacity based on a yield from ingots of 68.9 %	-	48	53,946,300	xxxxxxx	95.4	xxxxx	xxxxxxx	xxxxxxx	79.7	xxxxxxx	xxxxxxx
Iron Products	Pig iron, ferro manganese and spiegel	26	49	xxxxxxx	566,136	xxx	53,178	164,024	4,156,479	xxx	422,961	1,113,296
	Ingot moulds	4	50	xxxxxxx	48,609	xxx	731	xxxxxxx	337,076	xxx	3,214	xxxxxxx
	Bars	10	51	160,600	2,890	22.0	1	138	22,407	18.6	106	1,643
	Pipe and tubes	3	52	109,377	4,155	46.4	13	xxxxxxx	29,887	36.5	698	xxxxxxx
	All other	3	53	71,180	1,048	18.0	301	223	9,037	17.0	1,861	2,326
	TOTAL IRON PRODUCTS (ITEMS 51 to 53)	12	51	276,247	8,093	35.8	315	361	61,331	29.7	2,665	3,969

Total Number of Companies Included - 153

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products: Current month 4,212,731 *N.T.:* 95.4 *% of Finishing Capacity.*
To date 32,182,860 *N.T.:* 79.7 *% of Finishing Capacity.*
The above tonnages represent 68.9 *% of the ingots produced by companies whose products are included above.*

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	Nov. 4, 1940	Oct. 29, 1940	Oct. 8, 1940	Nov. 7, 1939
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.00
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.00
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	1.92
Skelp (grvd.)	1.90	1.90	1.90	1.90

	Nov. 4, 1940	Oct. 29, 1940	Oct. 8, 1940	Nov. 7, 1939
Pig Iron:				
(Per Gross Ton)				
No. 2 fdy., Philadelphia	$24.84	$24.84	$24.84	$24.84
No. 2, Valley furnace	23.00	23.00	23.00	23.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	23.06
No. 2, Birmingham	19.38	19.38	19.38	19.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	23.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	24.34
Basic, Valley furnace	22.50	22.50	22.50	22.50
Malleable, Chicago†	23.00	23.00	23.00	23.00
Malleable, Valley	23.00	23.00	23.00	23.00
L. S. Charcoal, Chicago	30.34	30.34	30.34	30.34
Ferromanganese‡	120.00	120.00	120.00	100.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap:				
(Per Gross Ton)				
Heavy melting steel, P'gh.	$21.50	$21.50	$21.50	$21.50
Heavy melt'g steel, Phila.	20.75	20.75	20.625	21.75
Heavy melt'g steel, Ch'go	19.75	19.75	19.75	18.625
Carwheels, Chicago	20.25	20.25	20.25	17.50
Carwheels, Philadelphia	22.75	22.75	22.75	22.25
No. 1 cast, Pittsburgh	22.25	22.25	20.25	22.25
No. 1 cast, Philadelphia	22.75	22.75	22.25	24.25
No. 1 cast, Ch'go (net ton)	17.75	17.75	17.75	16.25
Coke, Connellsville:				
(Per Net Ton at Oven)				
Furnace coke, prompt	$4.75	$4.75	$4.75	$5.00
Foundry coke, prompt	5.25	5.25	5.25	5.75
Non-Ferrous Metals:				
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	12.00	12.00	12.00	12.50
Copper, Lake, New York	12.00	12.00	12.00	12.50
Tin (Straits), New York	*51.00*	51.50	51.00	54.50
Zinc, East St. Louis	7.25	7.25	7.25	6.50
Lead, St. Louis	5.35	5.35	4.85	5.35
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 125 to 134 herein.
On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Nov. 4, 1940	2.261c. a Lb.	$22.61 a Gross Ton	$20.67 a Gross Ton
One week ago	2.261c. a Lb.	$22.61 a Gross Ton	$20.67 a Gross Ton
One month ago	2.261c. a Lb.	$22.61 a Gross Ton	$20.62 a Gross Ton
One year ago	2.236c. a Lb.	$22.61 a Gross Ton	$20.63 a Gross Ton

	FINISHED STEEL High	FINISHED STEEL Low	PIG IRON High	PIG IRON Low	SCRAP STEEL High	SCRAP STEEL Low
1940	2.261c., Jan. 2	2.211c., Apr. 16			$20.67, Oct. 15	$16.04, Apr. 9
1939	2.286c., Jan. 3	2.236c., May 16	$22.61, Sept. 19	$20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

• Buying of steel this month has not slackened from fast October pace . . . Pig iron production hits an all-time peak of 4,445,961 net tons . . . Steel scrap composite unchanged for fourth consecutive week . . . Railroads purchase 3400 cars, 47,250 tons of rails.

THE outcome of the Presidential election will have no immediate effect on steel business except perhaps to intensify defense efforts now that politics has been removed from people's minds.

Seldom has a Presidential election passed with so little question as to the trend of business volume and production. Whatever the long-range future may bring, the outlook for many months to come—perhaps throughout 1941 at least—is for maximum activity in steel and related lines.

Buying of steel during the first week of November has not slackened from the active pace of October, in which there were substantial gains over September. Nor has steel production shown the slightest sign of halting. Although the industry rate is estimated as unchanged from last week's figure of 96 per cent, the trend seems to be still slightly upward.

Only in steel scrap prices has the upward trend been checked, and that appears to be an artificial situation created by fears of what Washington might do in the event of a runaway market. For the fourth consecutive week THE IRON AGE composite of steel scrap prices is unchanged at $20.67. The October average composite price was $20.63, highest since October, 1939, when the month's average was $21.48.

The iron and steel industry has become more acutely conscious of the price situation as a result of the various conferences that have been held in Washington by the National Defense Advisory Commission with particular relation to scrap and pig iron.

No other pig iron producer has followed the advances of $1.50 and $2 a ton announced a little over a week ago by the Pittsburgh Coke & Iron Co., and it does not appear likely that any will do so at the present time. Unless costs get out of hand, the outlook is for unchanged prices for the first quarter on steel products and pig iron. Though some high cost producers may try to obtain "premium" prices in order to make a profit, the majority of producers are apparently well satisfied with the returns which high production and current prices are affording.

MEANWHILE, pig iron consumers who do not have regular sources of supply are finding it difficult to obtain iron. Several producers are telling all but their usual customers that they have none to sell. Merchant furnaces not now in blast might find it difficult to obtain sufficient coke with which to operate unless additional ovens are lighted in the Connellsville beehive field, where 5000 of a possible 6600 ovens are now in production. Probably not more than 500 or 600 of the unlighted ovens could be put in service.

Production of pig iron in October was at an all-time peak. The month's total was 4,445,961 net tons; the daily rate 143,418 tons. The previous high record was 4,365,852 net tons in May, 1929. The October daily average was 3 per cent over that of September and the operating rate for the month was 94.8 per cent of capacity. The number of furnaces in blast on Nov. 1 was 195, a gain of two over the Oct. 1 figure. There are 235 potentially active furnaces, but some have not been operated in years. Limited supplies of coke may prevent a much further increase in the number of furnaces in blast at any one time.

THE upward trend of orders and production during the past month has been without the aid of gains in export orders. The British, though now inquiring for steel in somewhat larger volume, have not been buying as heavily as in last July and August. A good deal of unshipped tonnage remains on mill books; nevertheless exports to the United Kingdom in September were down, though they represented about three-fifths of the month's total of 965,444 gross tons. The total was a 7.7 decline from the 1,046,084 gross tons shipped in August, which was an all-time peak. In nine months of this year our iron and steel exports have been 5,489,951 gross tons, or three and a half times the January-September, 1939 total. Scrap exports were off about 100,000 tons in September, falling to 255,608 gross tons, and the nine months' scrap total was 2,419,833 tons.

Railroad purchases are becoming of greater importance in total steel tonnage. During the past week 3400 freight cars have been ordered, 2800 by the Santa Fe and 600 by the Pere Marquette. There are also new inquiries for 2450 cars—1000 for the Bessemer & Lake Erie, 750 for the Elgin, Joliet & Eastern and 700 for the Seaboard Air Line. Rail purchases total 47,250 tons, of which the Missouri Pacific bought 31,750 tons and the Southern Pacific and a subsidiary 15,500 tons.

Tin plate, long in the doldrums because of heavy inventories and a reduced food pack this year, is in greater demand as some users become apprehensive over next year's supplies.

The Industrial Pace . . .

EXPANDING ACTIVITY during the past week in all of the heavy goods industries represented in THE IRON AGE index of capital goods gave further impetus to the current rise and pushed the index to 117.4, 4.3 points above 113.1, recorded in the previous week, and comparing with 107.9 a month ago and 100.8 in the corresponding period of 1939. Heaviest factor in the advance was again the construction component, although considerable influence was exercised by the lumber series, which spurted 5.4 points in its largest weekly increase since July. The automobile index rose at a slightly higher rate than in the previous week.

The heavy engineering construction component advanced to 136.8 from 128.6 in the week previous, and compares with 113.2 a month ago, 78.3 in the comparable week of 1939, and 109.0 in the corresponding period of 1929. Total dollar volume of contracts awarded was $157,754,000, the third highest weekly total of the current year and 24 per cent above that of two weeks ago. Construction volume for the year to date, $3,205,815,000, exceeds all annual totals since 1929. As the result of expansion in both commercial and industrial building, privately financed construction in the past week reached the highest volume, $77,107,000, reported since March, 1930. This figure exceeds the corresponding week of 1939 by 216 per cent and was 124 per cent above the foregoing week. Public awards fell off to $80,647,000 from $92,926,000 two weeks ago. Outstanding contracts of the week were $37,000,000 for an airplane plant in Cincinnati, $10,000,000 for apartment houses in Buffalo, $10,000,000 for a smokeless powder plant in Wilmington, Del., and $10,000,000 for a small arms plant at Kansas City.

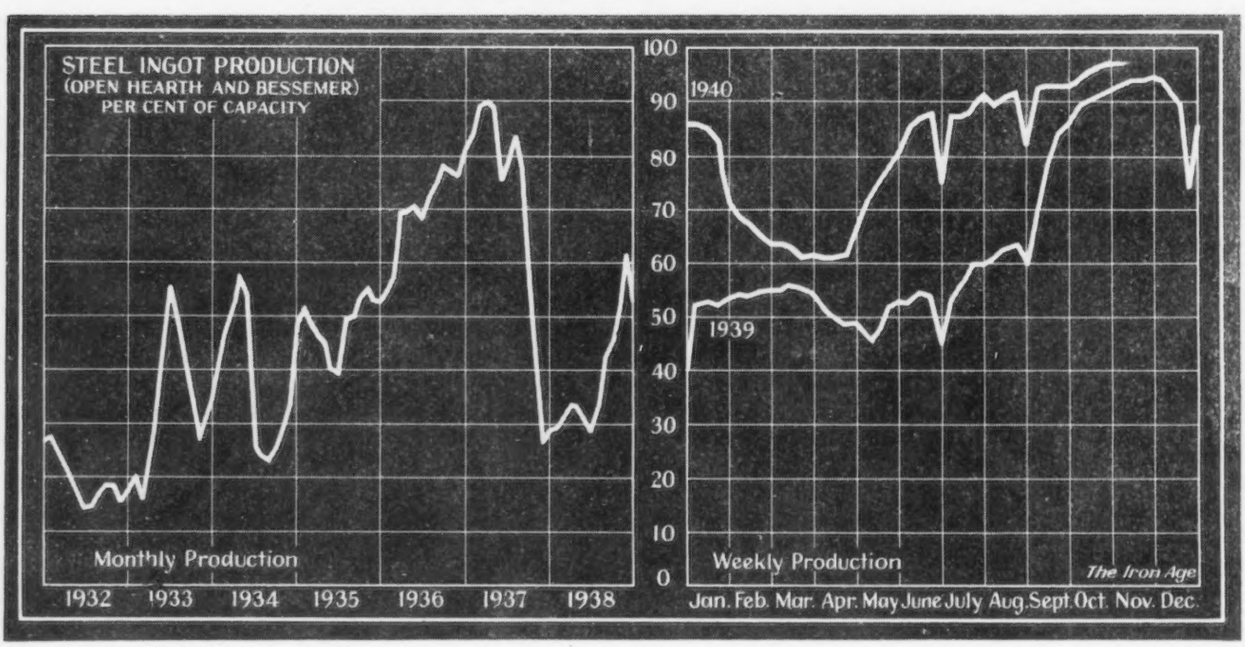
INCREASED PRODUCTION against a declining seasonal correction lifted the automobile series from 112.0 to 116.4 in the past week, which compares with 108.6 a month ago, and 107.8 in the corresponding week of 1939. Physical output totaled 118,092 units, as compared with 117,080 two weeks ago.

A continuation of increased business activity in the Pittsburgh district begun three weeks ago raised the component in the past week to 113.7 from 111.3 in the preceding period. This figure compares with 111.9 recorded a month ago, and 114.0 in the comparable week of 1939. Counter-seasonal operating increases in some major industries were chiefly responsible for the gain.

Mainly as the result of the placing of large contracts for the defense program, the value of new orders received by manufacturers in September rose sharply, exceeding the peak established shortly after the outbreak of war. Index of new orders rose to 164, the highest level in its history, with the exception of December, 1936, as compared with 140 in August, and 161 in September, 1939.

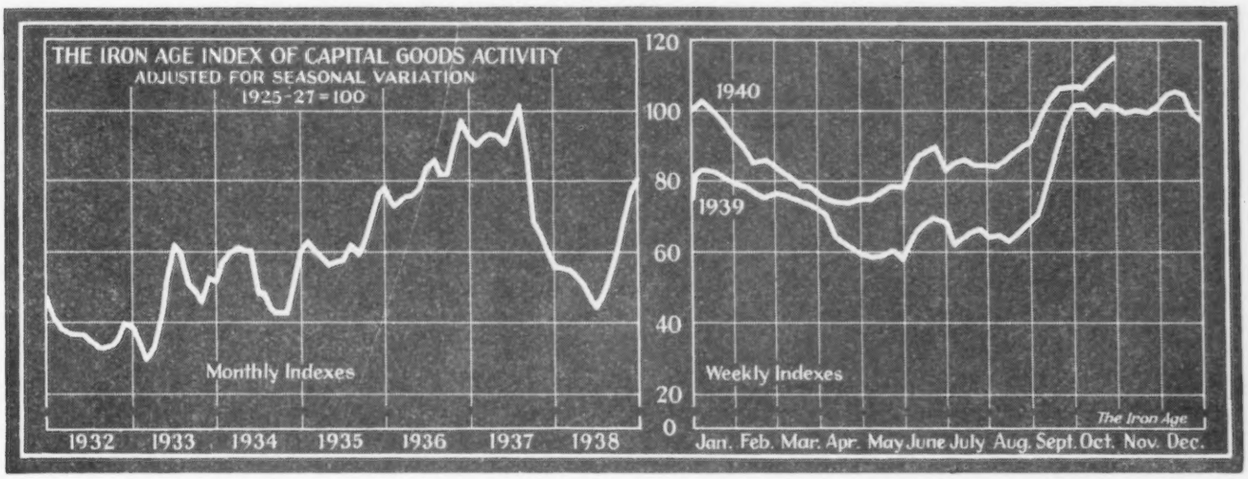
Realizing its most substantial gain of the year, the index measuring manufacturers' inventories rose in September to 135.5 from 133.5 in August, and was 22 per cent higher than the 110.9 recorded in September, 1939. Since the renewal of inventory accumulation, begun in April, the index has advanced approximately five points. Bulk of the rise has occurred in the producers' goods industries most affected by the defense program.

Ingot Output Holds To 96% Level



District Ingot Production, Per Cent of Capacity		Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
	Current Week..	96.0	97.0	94.0	94.0	89.0	106.0	104.0	100.0	109.0	109.0	69.0	100.0	80.0	**96.0**
	Previous Week..	95.0	98.0	95.0	94.0	87.0	108.5	104.0	100.0	109.0	109.0	69.0	100.0	80.0	**96.0**

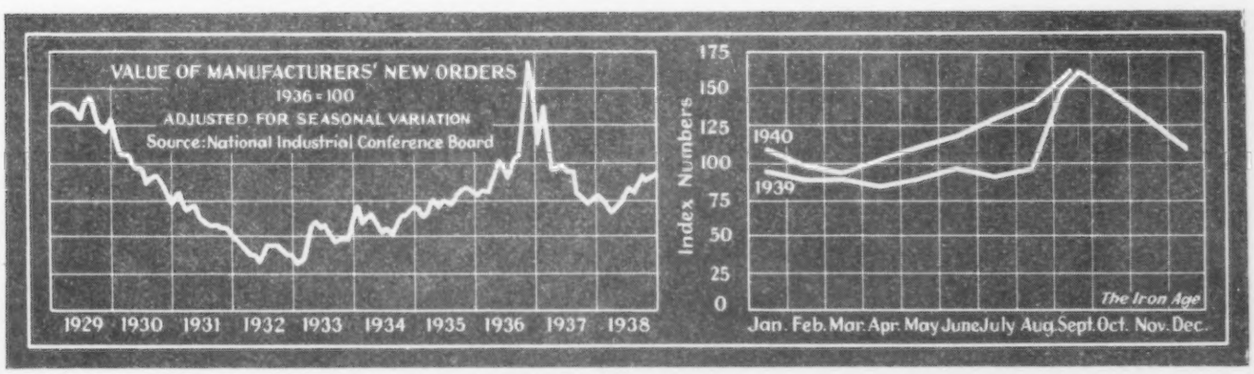
Capital Goods Index Extends Upward Movement



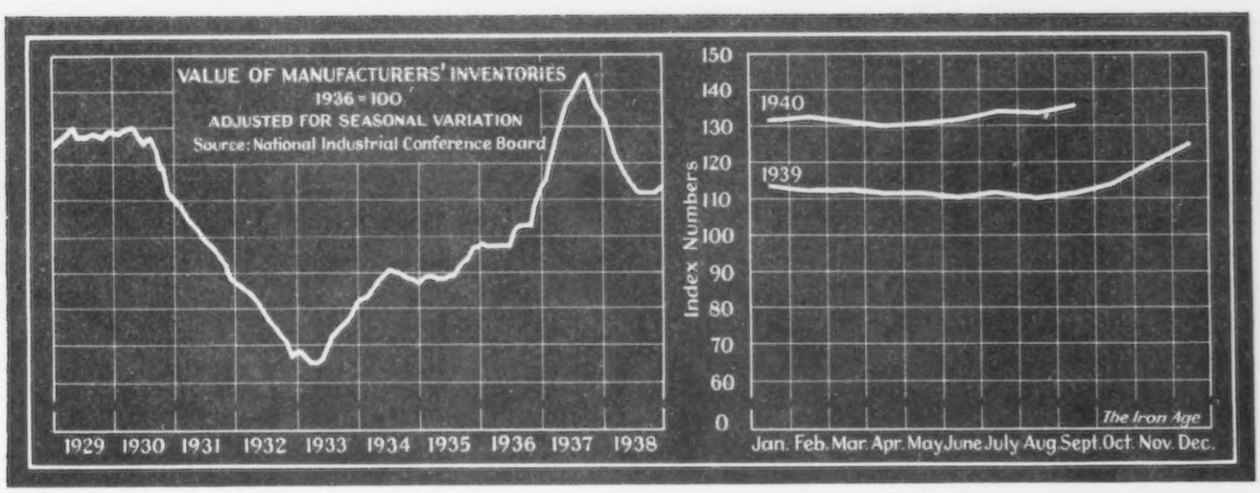
Component ▼ Week Ended ➤	Nov. 2	Oct. 26	Oct. 5	Nov. 4 1939	Nov. 2 1929
Steel ingot production[1]	139.3	138.2	132.5	134.4	111.0
Automobile production[2]	116.4	112.0	108.6	107.8	125.7
Construction contracts[3]	136.8	128.6	113.2	78.3	109.0
Forest products carloadings[4]	80.8	75.4	73.1	69.6	117.4
Pittsburgh output and shipments[5]	113.7	111.3	111.9	114.0	113.5
COMBINED INDEX	117.4	113.1	107.9	100.8	115.3

Sources: [1] THE IRON AGE; [2] Wards Automotive Reports; [3] *Engineering News-Record;* [4] Association of American Railroads; [5] University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended Oct. 26. Other indexes cover week of Nov. 2.

September Index of Orders Second Highest on Record



Manufacturers' Inventories Up Moderately In September



Market News

. . . THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

. . . No slackening in volume of orders from high October pace

Without important benefit from export tonnage, steel orders at PITTSBURGH the past week were as voluminous as in the previous week. October tonnage flowing to PITTSBURGH mills topped the September volume by 25 to 35 per cent. Significantly, this good showing was made at the same time British buying was down to peacetime levels. The trend of British purchases, however, is expected to point upward sharply soon as inquiries have recently increased. Shipments to England continue to be heavy. Steel inventories in consumers hands, according to reliable sources, are not in excess of 90 days supply at current production levels and the average for steel consuming industries is probably less than three months. PITTSBURGH mills continue to show discretion in analyzing and accepting apparently large steel bookings in order to keep speculative buying to a minimum. Despite the talk of bottlenecks, it is significant that steel mills are handling the present influx of business in such a forthright manner that backlogs in some products are actually less than they were a year ago.

With orders coming in to CHICAGO mills at a rate definitely ahead of shipments, backlogs are building up. At October's close, producers in that area found their business ranging from 70 per cent to 100 per cent ahead of September. One mill reports that its October shipments broke all records. The last week of the month for some mills set the high for the year. With strong domestic demand holding, defense business is making its presence felt increasingly in that district, where heretofore it had been a relatively unimportant factor in the operating picture.

Steel consumers' inventories have lengthened to an average between 90 and 120 days. First quarter buying is now clearly evident but, generally, mills accept future orders with reservations. In practically all cases, voluntary precedence to defense orders have kept steel moving to firms handling defense contracts. But fear of priorities is sending non-defense consumers in a rush to get their requirements booked.

Railroad buying is greatly accelerated in the CHICAGO area. Forgers, machinery manufacturers, agricultural implements, public and private construction are among the leading buying forces there.

October orders at CLEVELAND were the best of any month this year and compared favorably with the big months in the fall of 1939. In the case of one producer new tonnage during October set an all-time record. Backlogs are heaviest on a tonnage basis in carbon bars, sheets and strip and alloy steel. In dollar volume the alloy steel backlog ranks far above anything else. Additional sellers at CLEVELAND have gone out of the market temporarily on electric furnace alloy steel.

A breakdown of costs by a leading producer at Cleveland shows definite advances in pig iron and semi-finished steel since the early months of this year. The rise has not yet been reflected fully in costs of finished steel, as the stage is still transitory.

CLEVELAND reports heavy inquiries being circulated for shell steel.

Some belated buying for inventory, replacement buying by warehouses, plus a heavy demand for current output, maintained the past week's sales in the NEW YORK area on the high plane that prevailed through October. Stainless buying is especially active, particularly from jobbers, and average delivery date now is four to five weeks. Delivery of sheets against new orders is not obtainable before mid-December, usually later, on non-military projects. However, for work on the defense program, some interests are able to promise shipment by Nov. 30. The growing volume of defense program requirements is progressively pushing back delivery for non-military work and some consumers are, in some cases, endeavoring to anticipate needs as far forward as the first half of 1941. Sellers are endeavoring to discourage this activity and are limiting orders in an effort to keep all consumers supplied on current needs.

Bethlehem Steel Co. is low bidder on 48,000 tons of cast iron lining segments for the Battery-Brooklyn tunnel in New York. Bethlehem's bid was $3,123,785.

With the influx of orders from a wide variety of consumers showing no signs of slackening, deliveries of PHILADELPHIA district producers are being pushed back steadily. In addition to heavy bookings of plates and structural shapes, sheet tonnage figured more prominently in new business during October. One smaller producer supplying miscellaneous consumers is sold up for the quarter. Heavy bar buying has been constant, shipment before January now being virtually impossible.

SOUTHERN OHIO sheet producers are experiencing an increasing volume of defense business. Warehouse demand, as a result of delayed mill deliveries, also tends to broaden.

The last few weeks has seen a steady flow of orders by ST. LOUIS consumers for first quarter requirements, which are being placed for shipment at prices prevailing then.

Influx of orders for most products, particularly plates and bars, presages another record-breaking month at BIRMINGHAM after steel operations reached an all-time peak late in October.

With a backlog of 75,000 to 80,000 tons, the Ensley rail mill of the Tennessee Coal, Iron & Railroad Co. resumed operations Nov. 4. The mill was shut down early in September.

Steel Operations

. . . Rate for industry continues at last week's average of 96%

The rate at which steel ingots are being produced continues at approximately 96 per cent. If there is any variation at all from last week it is slightly on the up side, but THE IRON AGE weekly estimates do not include fractions of less than half a point.

There have been declines of one

point each in the CHICAGO and YOUNGSTOWN districts and a drop of two and a half points at BUFFALO, where the rate is still above 100 per cent of practical capacity. PITTSBURGH has gone up a point to 96 per cent and CLEVELAND-LORAIN has also gained a point to 89 per cent. Other districts are unchanged.

Pig Iron

. . . Some producers out of market except to regular trade

Pig iron consumers, without normal or usual sources of supply, are finding it difficult to obtain iron. Although some large pig iron producers have used the statement "we have none to sell," what they apparently mean is they have little or none to sell to newcomers but are taking care of their regular trade.

So far no pig iron producer has raised prices in line with the advance made recently by Pittsburgh Coke & Iron Co. at Youngstown, Ohio, and Sharpsville, Pa. This company made no change in its pig iron prices at Neville Island.

The amount of pig iron produced in the country by the use of beehive coke is an exceptionally small proportion of the total pig iron produced. There is a good possibility, however, that merchant pig iron producers who rely on beehive coke supplies may have to pay higher prices for their first quarter contracts.

Sheets and Strip

. . . Order books are being swelled by incoming tonnage

The wide variety of miscellaneous purchases and additional support from the automotive industry are swelling sheet order books at PITTSBURGH. The volume booked in October was well ahead of September buying and the trend which set in a few weeks ago is expected to continue in an upward movement over the next month or so at least. Sheet mill capacity is by no means a gage of the availability of supplies since practically every leading steel maker is allocating semi-finished steel to various finishing departments.

Though flat rolled products are relatively slower than other leaders at CHICAGO, incoming business is increasing and backlogs are building up. Galvanized sheets are particularly active bolstered by a strong general demand. Automotive sources are furnishing a steady call instead of coming in with a general buy. Railroad purchases have stepped up sheet sales, as have household appliance manufacturers and defense program needs.

Accelerated orders for defense material brought sheet steel demand in the SOUTHERN OHIO district slightly above 100 per cent of capacity during the past week. Demand continues to be well diversified. Foreign business is still only a negligible amount of current demand, while other normally considered peace time industries are still in the market for substantial amounts of sheets.

Warehouse Business

. . . Sales out of stock in October heaviest of year

Pittsburgh warehouse interests report October business to have run from 20 to 25 per cent ahead of the September volume. Ordering is brisk and, although some new accounts have been garnered because of extended mill deliveries, it is noted that requirements from regular warehouse consumers are heavier than a month ago. Some warehouse interests are having difficulty maintaining any semblance of stocks and in some instances material is moving out of the warehouse as fast as it comes from the mill. Demand is widely diversified with accent on plates and small structural shapes as well as bars. Warehouses which have not been able to build up supplies are chagrined by the extended delivery promises being quoted to them by steel mills.

CHICAGO warehouses report that October ran ahead of any month in the year. Reinforcing bar activity was strong, though not ahead of September. Warehouses are building up inventories in the face of a strong general demand, but they are finding it difficult to get steel.

An exceptionally heavy demand from contractors who are building cantonments, plus an increased volume of non-military requirements, pushed October bookings in the NEW YORK area substantially above the September total. In some cases the October business was largest on record. On Oct. 28 the larger interests in the NEW YORK district increased quotations on galvanized sheets 25c. a 100 lb. to a base of 4.55c. a lb. for 150 to 1499 lb., an action that had previously been taken by some of the smaller warehouses on Sept. 16. The heavy demand for galvanized sheets, together with the slowing up of mill deliveries, has created tightness in available material and some sellers are asking premiums of around $2 on lots of 10 bundles or less.

Warehouse business for October at ST. LOUIS is estimated to be 15 per cent ahead of September, the last half of the month having been especially active.

Volume of Philadelphia warehouse business in October was as high as 20 per cent better than September and one house reported an increase of 50 per cent over October, 1939. Orders were fairly diversified but were heaviest in structural shapes and bar stock.

Structural Steel

. . . A good deal of defense tonnage is still to come

Even though the structural market has received considerable impetus from the construction of buildings to house national defense machinery, further support is yet to come. Jobs about which little or nothing was known are appearing every day and a host of large projects known to be in the definite contract stage have not yet reached the point where the tonnage of steel involved is known.

Fabricated structural steel awards declined to 32,300 tons from 39,925 tons last week. The largest lettings include 9000 tons for a plant at Lockland, Ohio, for the Wright Aeronautical Corp.; 6434 tons for the Aluminum Co. of America at Lafayette, Ind.; 1800 tons for the Stearman division of the Boeing Aircraft Co. at Wichita, Kan., and 1070 tons for a trestle at Caddoa Dam, Col. New structural steel projects jumped to 20,400 tons from 7050 tons a week ago.

Sizable new inquiries reported are 5000 tons for bridges for the Chicago, Rock Island & Pacific

Railroad; 3100 tons for an addition to the Charles R. Huntley steam plant of the Buffalo, Niagara Electric Corp., at Tonawanda Township, N. Y.; 3000 tons for an addition to the Boeing Aircraft plant, Seattle, Wash.; 1300 tons for a munitions filling plant at Edgewood, Md.; 1100 tons at Schenectady, N. Y., for an order and stores building for the General Electric Co., and 1000 tons at Plymouth, Mich., for a manufacturing building and boiler house for the Kelsey-Hayes Wheel Co.

Awards for structural steel are reported being placed with Buffalo steel mills at a rate four times greater than at the same time last year.

Fabricating plants in the St. Louis industrial district are being operated at an estimated rate of 80 per cent of capacity. With one or two exceptions, backlogs are sufficient for operations through this month.

Railroad Buying

. . . 3400 freight cars ordered, inquiries for 2450

Railroad equipment buying in the past week was at a higher pace than in the preceding week, with 3400 cars ordered, new inquiries for 2450 cars issued, and 47,250 tons of rails purchased.

The largest freight car order was that of Santa Fe, involving 2800 cars distributed as follows: 2000 box cars to Pullman-Standard Car Mfg. Co.; 300 ballast cars to Rodger Ballast Car Co., and 500 box cars to General American Transportation Corp. In addition to these freight cars, Santa Fe has ordered 20 stainless passenger cars from Edward G. Budd Mfg. Co., one diesel-electric locomotive from Electro-Motive Corp. and one from American Locomotive Works.

In addition to the 200 gondolas awarded to Bethlehem Steel Co. by Pere Marquette, reported in THE IRON AGE of Oct. 17, this road has placed the following orders: 200 box cars to American Car & Foundry Co., and 150 box cars to Pullman-Standard Car Mfg. Co., 150 box cars to General American Transportation Corp., and 50 furniture and 50 automobile cars to Greenville Steel Car Co.

New freight car inquiries include box and 200 hopper cars for Seaboard Airline, 650 hopper, 300 box and 50 flat cars for Bessemer & Lake Erie, and 500 gondolas and 250 hopper cars for Elgin, Joliet & Eastern. Duluth, Missabe & Iron Range is inquiring for 30 ballast cars. Southern is seeking authority to buy five diesel-electric locomotives from Electro-Motive Corp. and 44 passenger cars from Pullman-Standard Car Mfg. Co.

The Missouri Pacific has ordered 31,750 tons of rails, the Southern Pacific 14,000 tons and the St. Louis Southwestern, subsidiary of the Southern Pacific, 1500 tons. The Missouri Pacific order was divided as follows: Carnegie-Illinois, 10,680 tons; Colorado Fuel & Iron, 9230 tons; Tennessee Coal, Iron & Railroad Co., 5915 tons; Inland Steel, 5025 tons; Bethlehem, 900 tons. An accompanying tonnage of track accessories was divided among several companies. The Southern Pacific order went to the Colorado Fuel & Iron Corp. and the the St. Louis Southwestern order to the Tennessee company.

State of Sao Paulo, Brazil, has purchased 20 electric locomotives from Electrical Export Corp.

Merchant Bars

. . . Sales continue to expand . . . October bookings up 20 to 30%

Long a barometer of general industrial activity, bar sales continue to expand as consumers of every description seek room on PITTSBURGH mill order books. October bar bookings ran from 20 to 30 per cent ahead of September volume and requirements in the past six days have been on a par with the rate booked in the week before. Bar stocks slated for shell making purposes, although not adding up to impressive totals, continue to increase from week to week and a high level of automobile production is also being reflected in bar specifications. Cold finished bar sales

Equip Your PRESENT MACHINE TOOLS for DOUBLE PRODUCTION At Small Cost

There are two ways to speed up production of steel parts for use in armaments and auxiliary equipment required by the emergency National Defense program.

The first is to acquire more floor space and install new machine tools, a time-consuming and obviously expensive method.

The second way is to install KENNAMETAL-tipped tools on your present equipment. This is by far the most practical and economical way of speeding up production, for KENNAMETAL cuts steel at 2 to 6 times greater speeds and combines roughing and finishing in one cut. It doubles the output of equipment already in use. The cost of KENNAMETAL tools is insignificant as compared to the cost of new machinery, and they can be put in operation almost overnight.

Do your share to speed up National Defense—investigate KENNAMETAL without delay. You cannot afford to waste time—a National Emergency exists. Write, wire or phone today for a free survey to show how KENNAMETAL can double your production of steel parts. No obligation—act now!

KENNAMETAL Steel-Cutting CARBIDE TOOLS

McKENNA METALS Co.
144 LLOYD AVENUE
LATROBE, PENNSYLVANIA, U.S.A.

are on the upgrade owing to support from jobbers as well as manufacturing outlets.

Both defense and general domestic demand for carbon and alloy bars at CHICAGO is the cause for increase of backlogs in this division. Deliveries have not lengthened sharply in the last 10 days, though some schedules are filled through November and part of early December.

Plates

. . . Railroad buying adds to bookings . . . January delivery quoted

Plate sales with some companies in October were not up to the September volume because of a sold-out position for the remainder of the year, and this condition applies to some extent to PITTSBURGH makers. Orders recently have been placed on the books to take the price at time of shipment.

With railroad buying sharply accelerated at CHICAGO, plate business holds its heavy pace. Santa Fe placed an order for 2800 freight cars, the steel for which is expected to go to producers in that district. Several roads have ordered diesel locomotives for both passenger and freight service. Incoming business is ahead of shipments.

New bookings in the NEW YORK area are still running in excess of shipments and delivery of material for non-military purposes is generally not available until the first two weeks of January. The current demand comes from a widely diversified source, with defense program needs becoming a more important factor. It is understood that producers have given the British Purchasing Commission until the end of this year to issue specifications against such French tonnage as is still outstanding at the price originally quoted on this business. After that date the current export price will prevail.

With large producers in the Philadelphia district unable to supply customers before late December, smaller mills have encountered steadily increasing pressure for material. The possibility of shipment of even small tonnages on short notice has now been eliminated. An Eastern railroad has placed an order for 7500 tons for a new car program with a district producer and smaller tonnages with other mills.

Iron Ore

. . . October vessel movements an all-time record for the month

Vessel shipments of Lake Superior iron ore from upper Lake ports during October set an all-time record for the month. The total was 10,061,127 gross tons. The cumulative total for the season to Nov. 1 is 58,296,354 tons, including 293,657 tons of Canadian ore. This compares with 39,593,570 tons shipped to Nov. 1, 1939.

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JOHNSON STEEL & WIRE CO., INC.

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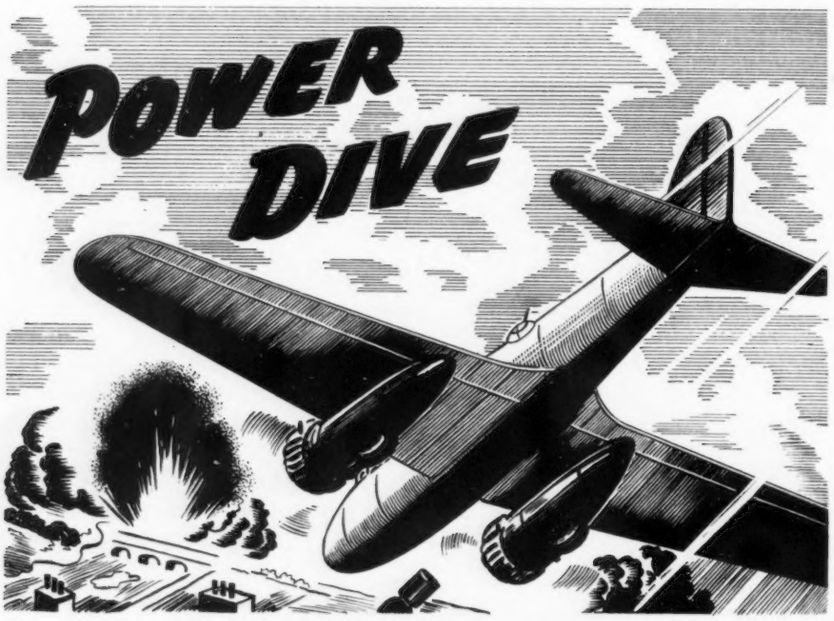
Branch Plants and Warehouses: AKRON, OHIO; LOS ANGELES, CALIF.

Coke

. . . More production in the Connellsville beehive field

Early this week approximately 5000 beehive coke ovens were in production in the Connellsville, Pa., region, a few hundred having been lighted in the past few weeks. Theoretically, approximately 6600 ovens are available in the Connellsville region but it is doubted if more than 500 or 600 in addition to the 5000 could be brought into operation at today's price level, to say nothing of the ability to obtain beehive coking coal. In the Latrobe Greensburg district, about 456 ovens out of 598 are making coke. Since few, if any, additional blast furnaces can be brought into blast in the western Pennsylvania and nearby areas, it is expected that present consumers of beehive furnace coke can be adequately cared for, although newcomers would find beehive furnace coke hard to obtain.

Although some spot business has been placed at slightly higher levels and involves small tonnages, beehive furnace coke f.o.b. Connellsville remains quotable at $4.50 to $4.75 and the leading steel interest is assured of beehive coke supplies from independent sources at $4.25 a ton for the rest of the year, contracts having been previously made at that price. Other fourth quarter contracts for beehive coke range from $4.50 to $4.75. Some beehive coke sellers and buyers look for higher first quarter contract prices.



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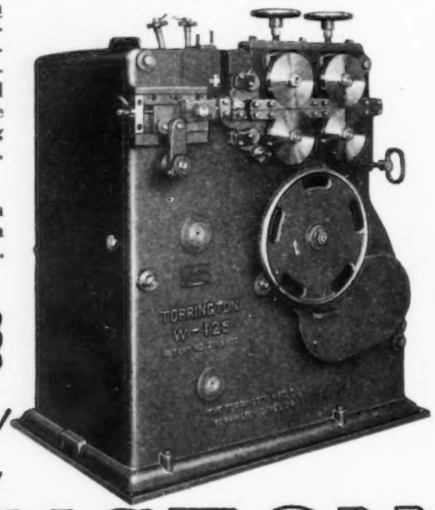

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Tubular Goods

. . . Oil country pipe in slightly better demand

Oil country goods specifications at PITTSBURGH during October were moderately ahead of the previous month and in the recent week the trend has been slightly upward as compared with three weeks ago. September, however, was a poor month. Movement of standard pipe to jobbers stocks has increased moderately, merchant pipe sales having stepped up somewhat owing to general business conditions and support from national defense projects. Army cantonments are taking quantities of merchant pipe, as are airplane and sea base jobs. Mechanical tubing demand is exceptionally strong.

Semi-Finished Steel

. . . Demand gains for sheet bars for non-integrated mills

Increased sheet sales by non-integrated steel mills have created a larger demand for sheet bars. The use of standard pipe in national defense projects has indirectly resulted in a heavy movement of skelp to non-integrated pipe mills and bookings have risen accordingly. Record-breaking semi-finished steel demand is likely to see an increased number of "horse trading" deals between various steel companies for some time to come.

Reinforcing Steel

. . . Reinforcing steel awards total 5000 tons, new projects 11,650 tons

Reinforcing steel awards of 5000 tons include 1400 tons for the Panama Canal. New reinforcing steel projects call for 11,650 tons. The largest inquiries are 5000 tons for an ammunition loading plant in Portage County, Ohio, for the Atlas Powder Co.; 2927 tons for the Panama Canal and 1500 tons for the housing project at Jamaica Plain and Roxbury, Mass.

Tin Plate

. . . Some users apprehensive about next year's supplies

Cold reduced tin plate operations throughout the country are being maintained at around 70 per cent of capacity while the rate for both cold and hot rolled plate approximates 46 per cent. The export outlook has dried up again while miscellaneous domestic business which, incidentally, is a small part of the total tonnage moved, has brightened up considerably in the past two weeks. This latter condition is the result of small tin plate users becoming apprehensive about future supplies, particularly for next year. Large can makers are comfortably well supplied with inventory.

Export Trade

. . . British buying recently has been at lower levels

Fresh orders from the British in the past week have been at a rate equal only to peacetime business. New bookings in the past month have been somewhat below the high levels reached last July and August. This drop in new business, however, is believed to be only temporary and the trend is expected to be definitely upward in the near future as inquiries have recently increased.

One of the reasons ascribed for the falling off in actual new business from the British is that the latter desire to have as much material now on order shipped to them before making large commitments for future delivery. Meanwhile, other export business is substantially unchanged from recent levels.

Gage Blank Standards Ready for Acceptance

• • • **With the recommendation** of the American Gage Design Committee, the Bureau of Standards is submitting Recommended Revision of Gage Blanks, Commercial Standard CS8-33, to producers, distributors and users of gage blanks for written acceptance prior to publication. The revision proposes new standards for thread setting plug gages, taper thread ring gages, dial indicators and master disks. Standard designs are proposed for spline plug and ring gages, taper plug and ring gages, flush pin gages, special snap gages and flat plug gages. Adjustable length gages are completely revised.

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WISCONSIN STEEL

Machine Tools

. . . SALES, INQUIRIES AND MARKET NEWS

Pressure to Expand Continues

Cincinnati

• • • **Machine tool bookings** in October showed an increase over the September level. One manufacturer states that October was the largest month in his company's history. With national defense needs becoming increasingly larger, domestic demand greatly overshadows the foreign demand, now almost wholly confined to Great Britain, Canada and British possessions. As a result of the increase in business, the dilemma of manufacturers becomes more intensified. With present rate of business high and delivery demands so urgent, there is definite warrant for substantial plant expansion. On the other hand, plant executives cannot see any advantage in tying up substantial amount of present profits in new buildings, which unquestionably will become useless or almost so when the present demand tapers.

Demand Still Strong

Cleveland

• • • **The machine tool** situation remains strong, demand being almost monotonously good. Recent orders include machines for the new Wright plant at Cincinnati and a flock of radial drills promised for late March delivery for a gun manufacturer. A forging plant in eastern Ohio has been buying liberally. Equipment plans are indefinite for a large electrical plant addition in this city.

The $8,820,040 order for 75-mm. shells awarded Willys-Overland Motors, Inc., at Toledo, will require 70,000 sq. ft. and 100 new turning and forging machines.

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Federal Aid to Builder

Chicago

• • • **With defense orders** coming increasingly to manufacturers in this central area, machine tool builders are getting increased pressure from all sides. One plant, with governmental aid, will soon start construction of a sizable plant addition so that production can be stepped up on some of the tools which have so far proved a bottleneck. A Chicago manufacturer with defense contracts is expected to announce plans for the purchase of approximately $1,750,000 worth of machine tools. Used machinery dealers are doing a landoffice business.

Aircraft Still in Spotlight

New York

• • • **Buying on the part** of the aircraft parts companies, particularly those making instruments, like Sperry Gyroscope Co., has been predominant in the past week or two. Small arms firms in middle Connecticut have also been extremely active, but manufacturers who have been figuring on larger ordnance items have yet to receive definite commitments from the government. Total buying is still many times the normal rate. Deliveries on standard machine tools now average next June or July. Some special classes of ordnance making equipment are being quoted well into 1942.

To Buy for Aircraft Parts

Detroit

• • • **About $100,000 worth** of equipment for the manufacture of automotive type bearings from specially prepared strip is being purchased by Moraine Products division of General Motors in Dayton. Tucker Aircraft Corp. and the newly organized airplane parts group of the Automobile Manufacturers Association are making headquarters at the Graham-Paige plant on West Warren Avenue, Detroit. It is understood that engineering and purchasing will be directed from this point.

Non-Ferrous Metals

. . . MARKET ACTIVITIES AND PRICE TRENDS

New York, November 4—Good sales volume and firm prices featured all major non-ferrous markets but tin in the past week. Supplies of zinc and lead have become increasingly tighter, a tendency which was accelerated in the latter market during the week. All major factors are adhering strictly to quoted levels and rationing of copper and zinc is still in effect.

An appreciable lessening of consumer pressure was apparent in the copper market during the week. Some influence was exercised by a number of consumers who previously had found themselves short but were gradually assuming desired stock positions. Custom smelters Thursday were offering metal for December delivery at 12.50c., while sellers in the outside market Friday were quoting 12.625c. for last quarter shipment. All large mine producers, however, are still quoting 12c. per lb., delivered Connecticut Valley, for electrolytic copper. Japanese buyers took moderate tonnages for export at 11.00c. per lb., f.a.s., New York, early in the week, but quotations later in the period declined to 10.50c., f.a.s.

Lead

Although not always spread uniformly among different producers on any particular day, consumer buying continued during the past week on the same full scale as in the previous period. As the result of the constant strength of demand recently, domestic supplies have become rather tight and some consumers not being able to satisfy all their needs. Prices are unchanged at 5.50c. per lb., New York.

Tin

Continued dearth of activity marked the tin market again during the past week. Due to the lack of consumer interest prices for prompt Straits metal moved gradually downward from 51.375c. on Wednesday to 51.125c. on Friday. The reduction appears as yet to have brought forth no consumer reaction. Small quantities of material for December arrival have been sold at 50.375c. Statistics appearing during the week placed total tin deliveries in this country for the first 10 months of the current year at 93,634 tons, exceeding all other annual totals, and comparing with 89,110 tons shipped in 1939.

Zinc

Excepting the fact that sales were not expected to equal the 10,120 tons of prime Western sold in the preceding period, market conditions in the past week remained unchanged. Second quarter production is being sold rapidly and first-quarter output is not far from the sold-out position. Prices remained firm and steady at 7.64c. per lb., delivered New York.

Aluminum

A further price reduction of 1c. per lb., the third reduction this year, will be made Nov. 18 by the Aluminum Co. of America, bringing the price of ingot metal to 17c. per lb.

October Averages

Average prices of the major non-ferrous metals in October, based on quotations appearing in THE IRON AGE, were as follows:

	Per Lb.
Electrolytic copper, Conn. Valley	12.00c.*
Lake copper, Eastern delivery	12.00c.
Straits tin, spot, New York	51.50c.
Zinc, East St. Louis	7.25c.
Zinc, New York	7.64c.
Lead, St. Louis	5.16c.
Lead, New York	5.31c.

* Mine producers only.

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Scrap . . . MARKET ACTIVITIES AND QUOTATION TRENDS

The scrap market appears to have become stabilized at present levels, with week-to-week price adjustments being limited largely to secondary items. THE IRON AGE composite price this week is unchanged for the fourth consecutive week at $20.67. The average composite price for October was $20.63, highest since October, 1939, when the average was $21.48. The past month's average represents a gain of 72c. from the September average. The lowest monthly average for the year to date is $16.14, recorded in April. The tremendous domestic demand for scrap is causing some changes in the normal distributing processes. For instance, scrap is now moving by barge from Providence to a consumer at Sparrows Point, Md., for the first time in a long while. Mills are also increasing the use of pig iron and production scrap, a procedure which is assuming important market significance at Pittsburgh, Cleveland and other districts. Canadian scrap dealers are intensifying their efforts to supply the demands of the expanding Canadian steel industry, but are meeting with only moderate success. It is felt that higher prices will be required before sufficient scrap can be brought from outlying districts to consuming points to satisfy all needs.

St. Louis

The market here was quiet all last week, the only buying being by dealers to cover short interests. Mills appear to prefer to wait until after election before making new commitments.

Pittsburgh

The volume of activity is but little changed from a week ago and No. 1 heavy melting remains quotably unchanged at $21 to $22 a ton, sales into consumption having been made within this range in the past week. The volume of production scrap is still a stabilizing factor in this market.

Chicago

Dull trading activity still characterizes the market here, with prices substantially unchanged from the preceding week. One of the largest sales last week was 25 cars of rerolling rails at $24.25, a railroad-broker transaction. Since some of the mills are beginning to use up old purchases, some quarters feel that buying will shortly increase in volume.

Philadelphia

Repeat orders of moderate tonnages at prices within the quoted range characterized the market in the past week. Quotations throughout the list are unchanged. Sellers are giving close attention to the probability of barge shipments intended originally for export backing up into the district. Such a movement, depending on the quantities involved, might have a tendency to soften the market.

Youngstown

The top price of $22 quoted on No. 1 heavy melting appears to be in line with offers, but actual transactions of any size have been lacking during the past week. Restrictions are still in force on shipments at one or two points.

Cleveland

The market remains nominal and unchanged here in the absence of fresh mill buying of any worthwhile proportions.

Buffalo

With what is reported to be a mill order of considerable proportions pending, the scrap situation here in the past week has been definitely on edge but without effect on quoted prices. A large consumer that made purchases outside the district is reported to have paid even higher prices than those asked locally. Dealers recently have been importing large quantities of low phosphorus scrap from Detroit.

Birmingham

Exporters at Gulf ports continue to feel effects of the cessation of shipments to Japan and inquiries from these dealers for domestic consumption are showing a substantial increase. A considerable amount of tonnage that formerly had been sent to export markets is moving into the district. Prices are unchanged.

Cincinnati

Dealers' bids are unchanged this week, although the market is definitely firm, with some factors which should indicate an increase in prices. Dealers, however, are trying to hold prices to current levels. A fair amount of scrap is coming into the market at present prices, although the trade seems to feel that some expansion will be necessary to attract larger quantities of scrap. No new commitments are reported.

Detroit

Corresponding with lower prices that have prevailed for scrap in Detroit in recent weeks, the November automotive lists brought prices averaging about 50c. a ton below bids of the month previous. This is probably an indication of the normal effects of the closing of the navigation season, because scrap sold on November lists could not be shipped before early December. There are some indications of continued weakness, but over all there seems to be a tendency to greater stability.

New York

A pre-election lull ruled in this market in the past week and dealers' and brokers' activity was on a limited scale. The dearth of boats for shipment to Britain and the corresponding slackening in buying for export account has caused a further decline of 25c. in export prices on No. 1 and 2 melting steel. Domestic prices are unchanged, except for a 50c. rise in cast borings which lately have been in exceptionally strong demand. Some small tonnages of structural scrap have been moved out of the World's Fair for shipment to a domestic mill.

Boston

From Providence, No. 1 and 2 steel is going to Sparrows Point, Md., via barge. One consumer is reported to have paid as high as $19.50, delivered, for No. 2, but the general market is $18.50 to $19, with No. 1 steel bringing about $1 a ton more. Blast furnace material, breakable cast, steel turnings and bundled skeleton, all for eastern Pennsylvania consumption, are 25c. a ton higher. All but blast furnace are moving in good volume. Blast furnace material consumer's specifications are rather stringent. Steel turnings are generally within the range $9.25 to $9.75. In contrast with a year ago, when two eastern Pennsylvania consumers were buying turnings, only one, a plate mill, is interested today. Some textile cast is moving into Worcester at $20 to $20.50, delivered, the top price applying to heavy textile, and the low to general run material.

Toronto

Intense activity features scrap markets here. Inquiries from consumers are increasing, with greater demands coming from melters outside the main steel centers. Prices continue to show strength and while the trend is upward, dealers are not rushing into action but are moving up those items that are receiving special attention. Stove plate was the only material to be moved up during the week, advancing 25c. to $15.25 a gross ton, delivered local yards. Stove plate is becoming scarce under increased call from smaller users at outside points. Cast scrap is in brisk demand and dealers are rationing supplies. Supplies reaching dealers' yards are in large tonnage, but consumer demands are moving ahead more rapidly than dealers are able to accumulate new stocks. Some dealers have expressed the opinion that substantial price advances may be necessary to bring out sufficient tonnage to meet all needs.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$21.00 to $22.00
Railroad heavy mltng.	22.50 to 23.00
No. 2 heavy melting	19.50 to 20.50
Railroad scrap rails	23.00 to 23.50
Rails 2 ft. and under	26.50 to 27.00
Comp. sheet steel	21.00 to 22.00
Hand bundled sheets	20.00 to 21.00
Heavy steel axle turn.	20.75 to 21.25
Heavy steel forge turn	19.75 to 20.25
Machine shop turnings	15.50 to 16.00
Short shov. turnings	17.00 to 17.50
Mixed bor. & turn.	14.75 to 15.25
Cast iron borings	14.50 to 15.50
Cast iron carwheels	22.50 to 23.50
Heavy breakable cast.	17.00 to 17.50
No. 1 cupola cast	22.00 to 22.50
RR. knuckles & coup.	27.50 to 28.00
Rail coil springs	27.50 to 28.00
Rail leaf springs	27.50 to 28.00
Rolled steel wheels	27.50 to 28.00
Low phos. billet crops	27.00 to 27.50
Low phos. punchings	27.00 to 27.50
Low phos. heavy plate	25.00 to 26.00
Railroad malleable	24.50 to 25.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$20.50 to $21.00
No. 2 hvy. mltng. steel	19.50 to 20.00
Hydraulic bund., new	20.50 to 21.00
Hydraulic bund., old	17.50 to 18.00
Steel rails for rolling	25.00 to 26.00
Cast iron carwheels	22.50 to 23.00
Hvy. breakable cast	21.00 to 21.50
No. 1 cupola cast	22.50 to 23.00
Mixed yard (f'd'y) cast	19.50
Stove plate (steel wks.)	18.00
Railroad malleable	22.50 to 23.00
Machine shop turn.	14.50 to 15.00
No. 1 blast furnace	13.00 to 13.50
Cast borings	14.50 to 15.00
Heavy axle turnings	19.00 to 19.50
No. 1 low phos. hvy.	25.50 to 26.00
Couplers & knuckles	25.50 to 26.00
Rolled steel wheels	25.50 to 26.00
Steel axles	25.00 to 25.50
Shafting	25.00 to 25.50
Spec. iron & steel pipe	18.00 to 18.50
Cast borings (chem.)	15.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy mltng. steel	$19.50 to $20.00
Auto. hvy. mltng. steel alloy free	18.50 to 19.00
No. 2 auto steel	16.25 to 16.75
Shoveling steel	19.50 to 20.00
Factory bundles	19.00 to 19.50
Dealers' bundles	17.50 to 18.00
No. 1 busheling	18.50 to 19.00
No. 2 busheling, old	11.50 to 12.00
Rolled carwheels	23.25 to 23.75
Railroad tires, cut	23.00 to 23.50
Railroad leaf springs	23.00 to 23.50
Steel coup. & knuckles	23.00 to 23.50
Axle turnings	18.75 to 19.25
Coil springs	24.00 to 24.50
Axle turn. (elec.)	19.75 to 20.00
Los phos. punchings	23.00 to 23.50
Low phos. plates 12 in. and under	22.50 to 23.00
Cast iron borings	13.25 to 13.75
Short shov. turn.	14.00 to 14.50
Machine shop turn.	13.00 to 13.50
Rerolling rails	24.00 to 24.50
Steel rails under 3 ft.	23.00 to 23.50
Steel rails under 2 ft.	23.50 to 24.00
Angle bars steel	22.00 to 22.50
Cast iron carwheels	20.50 to 21.00
Railroad malleable	23.00 to 23.50
Agric. malleable	17.50 to 18.00
	Per Net Ton
Iron car axles	$24.50 to $25.00
Steel car axles	24.00 to 24.50
Locomotive tires	18.00 to 18.50
Pipes and flues	14.00 to 14.50
No. 1 machinery cast	17.50 to 18.00
Clean auto. blocks	18.00 to 18.50
No. 1 railroad cast	16.50 to 17.00
No. 1 agric. cast	16.00 to 16.50
Stove plate	13.00 to 13.50
Grate bars	14.00 to 14.50
Brake shoes	14.25 to 14.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$21.50 to $22.00
No. 2 hvy. mltng. steel	20.50 to 21.00
Low phos. plate	24.00 to 24.50
No. 1 busheling	20.75 to 21.25
Hydraulic bundles	21.00 to 21.50
Machine shop turn.	14.00 to 14.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$20.50 to $21.00
No. 2 hvy. mltng. steel	19.50 to 20.00
Comp. sheet steel	$20.00 to $20.50
Light bund. stampings	16.50 to 17.00
Drop forge flashings	19.25 to 19.75
Machine shop turn.	12.50 to 13.00
Short shov. turn.	13.00 to 13.50
No. 1 busheling	19.75 to 20.25
Steel axle turnings	20.00 to 20.50
Low phos. billet and bloom crops	25.00 to 25.50
Cast iron borings	14.00 to 14.50
Mixed bor. & turn.	14.00 to 14.50
No. 2 busheling	14.00 to 14.50
No. 1 cupola cast	22.00 to 22.50
Railroad grate bars	15.50 to 16.00
Stove plate	15.50 to 16.00
Rails under 3 ft.	25.50 to 26.00
Rails for rolling	25.00 to 25.50
Railroad malleable	24.50 to 25.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$20.00 to $20.50
No. 2 hvy. mltng. steel	18.00 to 18.50
Scrap rails	21.50 to 22.00
New hvy. b'ndled sheets	18.00 to 18.50
Old hydraul. bundles	16.50 to 17.00
Drop forge flashings	18.00 to 18.50
No. 1 busheling	18.00 to 18.50
Machine shop turn.	13.50 to 14.00
Shov. turnings	14.50 to 15.00
Mixed bor. & turn.	13.50 to 14.00
Cast iron borings	13.50 to 14.00
Knuckles & couplers	24.50 to 25.00
Coil & leaf springs	24.50 to 25.00
Rolled steel wheels	24.50 to 25.00
No. 1 machinery cast	20.50 to 21.00
No. 1 cupola cast	19.00 to 19.50
Stove plate	17.00 to 17.50
Steel rails under 3 ft.	25.50 to 26.00
Cast iron carwheels	18.50 to 19.50
Railroad malleable	22.50 to 23.50
Low phos. plate	25.00 to 26.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	$17.00 to $17.50
No. 1 hvy. melting	17.25 to 17.75
No. 2 hvy. melting	16.00 to 16.50
No. 1 locomotive tires	20.00 to 20.50
Misc. stand. sec. rails	20.25 to 20.75
Railroad springs	21.50 to 22.00
Bundled sheets	13.00 to 13.50
Cast bor. & turn.	10.00 to 10.50
Machine shop turn.	10.50 to 11.00
Heavy turnings	13.25 to 13.75
Rails for rerolling	23.00 to 24.00
Steel car axles	23.50 to 24.00
No. 1 RR. wrought	14.50 to 15.00
No. 2 RR. wrought	16.50 to 17.00
Steel rails under 3 ft.	23.25 to 23.75
Steel angle bars	20.50 to 21.00
Cast iron carwheels	20.00 to 20.50
No. 1 machinery cast	19.50 to 20.00
Railroad malleable	20.00 to 20.50
Breakable cast	17.25 to 17.75
Stove plate	13.50 to 14.00
Grate bars	13.50 to 14.00
Brake shoes	14.50 to 15.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	$16.25 to $17.75
No. 2 hvy. mltng. steel	14.75 to 15.25
Scrap rails for mltng.	21.75 to 22.25
Loose sheet clippings	11.50 to 12.00
Hyd'lic bundled sheets	15.50 to 16.00
Cast iron borings	7.75 to 8.25
Machine shop turn.	8.75 to 9.25
No. 1 busheling	12.25 to 12.75
No. 2 busheling	6.50 to 7.00
Rails for rolling	23.25 to 23.75
No. 1 locomotive tires	18.50 to 19.00
Short rails	23.75 to 24.25
Cast iron carwheels	17.75 to 18.25
No. 1 machinery cast	20.25 to 20.75
No. 1 railroad cast	18.75 to 19.25
Burnt cast	12.25 to 12.75
Stove plate	12.25 to 12.75
Agricul. malleable	16.75 to 17.25
Railroad malleable	19.75 to 20.25
Mixed hvy. cast	17.50 to 18.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	$18.00
No. 2 hvy. melting steel	17.00
No. 1 busheling	16.00
Scrap steel rails	17.00
Steel rails under 3 ft.	19.50
Rails for rolling	20.00
Long turnings	7.50
Cast iron borings	8.50
Stove plate	11.00
Steel axles	18.00
No. 1 RR. wrought	16.00
No. 1 cast	17.00
No. 2 cast	13.00
Cast iron carwheels	17.00
Steel carwheels	18.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting	$16.00 to $16.50
No. 2 heavy melting	15.00 to 15.50
Borings and turnings	11.50 to 12.00
Machine shop turnings	11.50 to 12.00
Long turnings	9.50 to 10.00
Short shov. turnings	12.00 to 12.50
No. 1 cast	18.50 to 19.00
Automotive cast	18.50 to 19.00
Hvy. breakable cast	15.00 to 15.50
Stove plate	12.25 to 12.75
Hydraul. Comp. sheets	18.50 to 19.00
New busheling	16.50 to 17.50
Sheet clips	14.50 to 15.00
Flashings	16.00 to 16.50
Low phos. plate	20.00 to 20.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	$16.00 to $16.50
No. 2 hvy. mltng. steel	15.00 to 15.50
Hvy. breakable cast	17.00 to 17.50
No. 1 machinery cast	18.50 to 19.00
No. 2 cast	15.50 to 16.00
Stove plate	13.00 to 13.50
Steel car axles	20.00 to 21.00
Shafting	20.00 to 20.50
No. 1 RR. wrought	14.50 to 15.50
No. 1 wrought long	13.00 to 13.50
Spec. iron & steel pipe	12.00 to 12.50
Rails for rolling	20.00 to 20.50
Clean steel turnings*	10.00 to 10.50
Cast borings*	9.50 to 10.00
No. 1 blast furnace	9.00 to 9.50
Cast borings (chem.)	10.00 to 11.00
Unprepared yard scrap	8.50 to 9.00
Light iron	6.50 to 7.00
Per gross ton delivered local foundries:	
No. 1 machin. cast	$19.00 to $19.50
No. 2 cast	16.00 to 16.50

* $1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

Breakable cast	$15.50 to $15.75
Machine shop turn.	9.50 to 9.75
Mixed bor. & turn.	8.00 to 8.25
Bun. skeleton long	12.50 to 12.75
Shafting	19.50 to 19.65
Stove plate	12.50 to 12.75
Cast bor. chemical	9.50 to 9.75
Per gross ton delivered consumers' yards:	
Textile cast	$19.00 to $21.00
No. 1 machine cast	17.00 to 20.00
Per gross ton delivered dealers' yards:	
No. 1 hvy. mltng. steel	$15.50 to $15.75
No. 2 steel	14.50 to 14.75

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	$13.50	to	$14.00
No. 2 hvy. mltng. steel		$13.00	
Bundles		12.00	

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel	$12.50	$12.00
No. 1 hvy. mltng. steel	11.25	10.75
No. 2 hvy. mltng. steel	10.00	9.75
Mixed dealers steel	8.75	8.25
Drop forge flashings	9.75	9.25
New loose clippings	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.50	7.00
Cast borings	7.50	7.00
Machinery cast	20.00	19.00
Dealers' cast	19.00	18.00
Stove plate	15.25	14.75

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered barges	
No. 1 hvy. mltng. steel	$16.00
No. 2 hvy. mltng. steel	15.00
No. 2 cast	$15.00 to 15.50
Stove plate	13.00 to 13.50
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel	$17.00
No. 2 hvy. mltng. steel	15.50
Rail (scrap)	17.00
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel	Nominal
No. 2 hvy. mltng. steel	Nominal

Construction Steel

. . .STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings decline to 32,300 tons from 39,925 tons last week; new projects advance to 20,400 tons; plate awrads call for 1780 tons.

AWARDS

NORTH ATLANTIC STATES

940 Tons, Stratford, Conn., Vought-Sikorsky Aircraft division factory addition, to an unnamed fabricator.

675 Tons, Elmira, N. Y., power house for Bendix Aviation Corp., to American Bridge Co., Pittsburgh.

400 Tons, West Lynn, Mass., factory building for General Electric Co., to American Bridge Co., Pittsburgh.

382 Tons, Jersey City, N. J., building for Wallace Laboratories, to Ingalls Iron Works Co., Pittsburgh plant.

340 Tons, Philadelphia, Poplar housing project, to Empire City Iron Works, Long Island City, N. Y.

320 Tons, New York, coal handling, Waterside Station, to American Bridge Co., Pittsburgh.

270 Tons, Tioga County, Pa., truss bridge R-58089, to Lackawanna Steel Construction Corp., Buffalo.

240 Tons, Bellevue, D. C., barracks building, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

225 Tons, Lackawanna, N. Y., Wilputte Coke Oven Corp., deck slab supports, to Lackawanna Steel Construction Corp., Buffalo.

210 Tons, Lynn, Mass., garage for General Electric Corp., to American Bridge Co., Pittsburgh.

200 Tons, Baychester, N. Y., bridges Nos. 7.69 and 7.85 for New York, New Haven & Hartford Railroad, to American Bridge Co., Pittsburgh.

140 Tons, New Rochelle, N. Y., radio tower, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

115 Tons, Philadelphia, storehouse No. 303 for Frankford Arsenal, to F. M. Weaver & Co., Lansdale, Pa.

110 Tons, Syracuse, N. Y., Greyhound bus terminal, to Syracuse Engineering Co., Syracuse.

110 Tons, Buffalo, storage plant for Dow & Co., Inc., to R. S. McMannus Steel Construction Co., Inc., Buffalo.

100 Tons, Worcester, Mass., Norton Co. plant, to United Structural Co., Worcester.

THE SOUTH

845 Tons, Norfolk, Va., 1941 extension, Reeves Avenue power station, to Lehigh Structural Steel Co., Allentown, Pa.

760 Tons, San Angelo and Ellington Field, Tex., Air Corps hangars, to Mosher Steel Co., Dallas, Tex.

530 Tons, State of Texas, Department of Interior, Bureau of Reclamation, specification No. 1424-D, to Stupp Brothers Bridge & Iron Co., St. Louis.

290 Tons, Kentucky Dam, spillway bridge for TVA, to Duffin Iron Co., Chicago.

195 Tons, Newport News Va., Bell Telephone building, to Lehigh Structural Steel Co., Allentown, Pa.

180 Tons, Llano, Tex., bridge to Peden Iron & Steel Co., Houston, Tex.

170 Tons, Radford, Va., building for Hercules Powder Co., to Ingalls Iron Works Co., Birmingham.

CENTRAL AWARDS

9000 Tons, Lockland, Ohio, plant for Wright Aeronautical Corp. of Ohio, to Whitehead & Kales Co., Detroit.

6434 Tons, Lafayette, Ind., Aluminum Co. of America buildings, 5823 tons to Bethlehem Steel Co., Bethlehem, Pa.; 611 tons to Indiana Bridge Co., Muncie, Ind.

1800 Tons, Wichita, Kan., Stearman Division, Boeing Aircraft Co., to Kansas City Structural Steel Co., Kansas City, Kan., through Austin Co.

920 Tons, Pepin County, Wis., bridge project 6310, to Worden-Allen Co., Milwaukee.

660 Tons, Rhinelander, Wis., building for R. Paper Co., to Wisconsin Bridge & Iron Co., Milwaukee.

585 Tons, Harvey, Ill., forge shop building, to Mississippi Valley Structural Steel Co., St. Louis.

350 Tons, Seville, Ill., Spoon River bridge for Toledo, Peoria & Western Railroad Co., to American Bridge Co., Pittsburgh.

300 Tons, Decatur, Ill., Sears, Roebuck & Co. store, to Midland Structural Steel Co., Cicero, Ill.

250 Tons, St. Louis, warehouse for Sears, Roebuck & Co., to Mississippi Valley Structural Steel Co., St. Louis, through Fruin-Colnon Contracting Co., St. Louis, general contractor.

230 Tons, St. Louis, U. S. Engineers, spare lock unit, to Lakeside Bridge & Steel Co., Milwaukee.

195 Tons, Cincinnati, housing project 4-2, to Jones & Laughlin Steel Corp., Pittsburgh.

185 Tons, Cincinnati, Hilton Davis Chemical Co. building, to Joseph T. Ryerson & Son, Inc., Chicago.

170 Tons, Jeffersonville, Ind., central heating plant, to Bedford Foundry & Machine Co., Bedford, Ind.

115 Tons, Grant County, Wis., Blue River bridge, to Midland Structural Steel Co., Cicero, Ill.

100 Tons, Detroit, service building for Gar Wood Industries, Inc., to R. C. Mahon Co., Detroit.

WESTERN STATES

1070 Tons, Caddoa, Colo., construction trestle, to Consolidated Steel Corp., Los Angeles.

580 Tons, Ogden, Utah, Army Air Corps reclamation building and engine repair building, to Duffin Iron Works, Chicago, through N. P. Severin Co., Chicago, contractor.

450 Tons, Tongue Point, Ore., Navy seaplane hangar, to Willamette Iron & Steel Corp., Portland, Ore.

122 Tons, Earp, Cal., gate frames and latches for penstock gates, Parker power plant (Bureau of Reclamation Specifications 1437-D), to Valley Iron Works, Yakima, Wash.

100 Tons, Burbank, Cal., Lockheed Aircraft Corp. plant, to Apex Steel Corp., Los Angeles.

100 Tons, Boulder City, Nev., anchor jacks, Boulder Dam (Bureau of Reclamation Specifications 1419-D), to Schmitt Steel Co., Portland, Ore.

HAWAII

725 Tons, Hickam Field, T. H., double hangar (Invitation QM-6812-41-14), to Minneapolis-Moline Power Implement Co., Minneapolis, through Robert E. McKee, Los Angeles, contractor.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

3100 Tons, Tonawanda Township, N. Y., addition to Charles R. Huntley steam plant of Buffalo Niagara Electric Corp. Cost $6,000,000.

1300 Tons, Edgewood, Md., munitions filling plant for Government.

1100 Tons, Schenectady, N. Y., order and stores building for General Electric Co.

850 Tons, New Haven, Conn., building for St. Raphael's Hospital.

750 Tons, Schenectady, N. Y., highway bridge; Fred Berlanti & Son, Harrison, N. Y., general contractor.

450 Tons, New Brunswick, N. J., Rutgers University library building.

425 Tons, Dover, N. J., warehouses A and B, Picatinny Arsenal, for Government.

415 Tons, New York, St. Clare's Hospital addition for Catholic Diocese of New York.

375 Tons, Dover, N. J., black powder building, etc., for Government.

350 Tons, Ardmore, Pa., manufacturing building for Autocar Co.

300 Tons, Falmouth, Mass., Air Corps hangar for Government.

240 Tons, Baltimore, manufacturing building for Rheem Mfg. Co.

220 Tons, New York, building for St. Helena's Church in Bronx.

206 Tons, Cambridge, Mass., Harvard Rare Book Library; George A. Fuller Construction Co., Boston, contractor.

190 Tons, Hartford, Conn., office building for Colt Mfg. Co.

180 Tons, Butler County, Pa., State underpass.

175 Tons, Painted Post, N. Y., factory addition for Ingersoll Rand Co.

Weekly Bookings of Construction Steel

Week Ended——→	Nov. 4, 1940	Oct. 29, 1940	Oct. 8, 1940	Nov. 7, 1939	Year to Date 1940	Year to Date 1939
Fabricated structural steel awards	32,300	39,925	39,400	20,550	986,110	817,875
Fabricated plate awards	1,780	2,360	2,210	3,150	127,710	139,355
Steel sheet piling awards	175	1,435	400	2,770	65,180	73,865
Reinforcing bar awards	5,000	8,950	12,600	5,115	402,310	403,090
Total Letting of Construction Steel	39,255	52,670	54,610	31,585	1,581,310	1,434,185

150 Tons, Corfu, N. Y., highway bridge; bids rejected and new bids to be taken Nov. 27.

140 Tons, Genesee County, N. Y., highway bridge.

120 Tons, Camden, N. J., shipway caisson gate for New York Shipbuilding Corp.

SOUTHWEST

100 Tons, Flagstaff, Ariz., Department of Interior, Moencope Wash bridge.

CENTRAL STATES

5000 Tons, Wilmington, Ill., munition plant; Stone & Webster Construction Co., Boston, contractor.

5000 Tons, Various locations, 1941 bridge requirements for Chicago, Rock Island & Pacific Railroad Co.

1000 Tons, Plymouth, Mich., manufacturing building and boiler house for Kelsey-Hayes Wheel Co.

325 Tons, South Chicago, wire mill warehouse for Republic Steel Corp.

250 Tons, Dayton, Ohio, plastic manufacturing building for General Motors Corp., Inland Mfg. Co.

200 Tons, Table Rock, Neb., State bridge.

185 Tons, Butler County, Ohio, State bridge.

WESTERN STATES

3000 Tons, Seattle, Boeing Aircraft Co., plant addition.

200 Tons, Reno, Nev., University of Nevada engineering building; bids Nov. 16.

FABRICATED PLATES

AWARDS

1400 Tons, Middletown, Ohio, 10 coal barges for American Rolling Mill Co., to St. Louis Shipbuilding & Steel Co., St. Louis.

160 Tons, Fort Devens, Mass., water tank, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

110 Tons, Brunswick, Ga., tanks for International Filter Co., to R. D. Cole Mfg. Co., Newnan, Ga.

110 Tons, Worcester, Mass., Norton Co., 108 tanks, to Southbridge Roofing Co., Southbridge, Mass.

SHEET PILING

AWARDS

176 Tons, Santa Barbara, Cal., Treasury Department (Specifications 176), to Columbia Steel Co., San Francisco.

Reinforcing Steel

Awards of 5,000 tons; 1,650 tons in new projects

AWARDS

ATLANTIC STATES

400 Tons, Rochester, N. Y., Eastman Kodak Co. factory, to Bethlehem Steel Co., Bethlehem, Pa., through A. W. Hopeman & Sons, contractors.

130 Tons, Neversink, N. Y., Delaware Aqueduct contract No. 367, to Bethlehem Steel Co., Bethlehem, Pa., through D. W. Winkleman, contractor.

100 Tons, Concord, N. H., Farmers Exchange Building, to Concrete Steel Co., Boston.

100 Tons, Cambridge, Mass., Harvard Rare Book Library, to Northern Steel Co., Boston.

CENTRAL STATES

850 Tons, Cleveland, Cuthwaite Homes housing project, to Calumet Steel Co., through James McHugh & Sons, Chicago, contractors.

700 Tons, Cincinnati, English Woods housing project, to Pollak Steel Co., through J. & E. Warm Co., contractor.

200 Tons, Great Lakes Naval Training Station, Ill., training facilities, to Calumet Steel Co., Chicago.

135 Tons, Chicago, factory building, Charles Bruning Co., to Joseph T. Ryerson & Son, Inc., Chicago.

108 Tons, Chicago, factory building, A. C. Neilson Co., to Joseph T. Ryerson & Son, Inc., Chicago.

100 Tons, Chicago, WPA project 52971, to Youngstown Sheet & Tube Co., Youngstown, Ohio.

WESTERN STATES

338 Tons, Oakland, Cal., administration building, cafeteria, eating plant at Naval Supply Base (Specifications 9973), to Ceco Steel Products Co., San Francisco, through James I. Barnes Construction Co., Santa Monica, Cal., contractor.

120 Tons, Falk, Idaho, Boise project (Bureau of Reclamation Invitation 21,190-A), to Pacific States Steel Corp., San Francisco.

118 Tons, Los Angeles, mesh for Metropolitan Water District (Specifications 344), to California Wire Cloth Corp., Los Angeles.

CANAL ZONE

1400 Tons, Panama Canal, to Bethlehem Steel Co., Bethlehem, Pa.

187 Tons, Panama Canal, schedule No. 4406, to Laclede Steel Co., St. Louis.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

1500 Tons, Boston, Jamaica Plain and Roxbury housing project; bids due Nov. 15.

600 Tons, Queens, N. Y., Bureau of Sewers, contracts 1, 2 and 3; bids taken.

165 Tons, Hartford, Conn., Gully Brook conduit.

150 Tons, Lincoln-North Smithfield, R. I., mesh for highway.

150 Tons, New Haven, Conn., St. Raphael hospital addition.

CENTRAL STATES

5000 Tons, Portage County, Ohio, ammunition loading plant for Atlas Powder Co.; Hunkin-Conkey Construction Co., contractor.

500 Tons, Marion, Ill., Veterans Hospital, Ring Construction Co., Minneapolis, general contractor.

120 Tons, Kansas City, Kan., 12th Street bridge over Kaw River.

WESTERN STATES

271 Tons, Schofield Barracks, Hawaii, Gun Battalion Barracks No. 2; bids in.

CANAL ZONE

2927 Tons, Panama Canal, General Purchasing Office, Washington; bids Nov. 14.

500 Tons, Panama Canal, four hangars, CQM 6708-41-22, Albrook Field.

250 Tons, Panama Canal, miscellaneous buildings, CQM 6708-41-23, Albrook Field.

Cast Iron Pipe

Danbury, Conn., will shortly be in the market for cast iron pipe and will improve its filter plant; cost about $140,000. Metcalf & Eddy, 1300 Statler Building, Boston, are engineers.

Portland District Water Co., Portland, Me., has been awarded contract by War Department for a water line at Fort Levett, Me., to cost $73,000.

Oakville, Conn., has plans for a water system and is awaiting legislative action. Buck & Buck, 650 Main Street, Hartford, are consulting engineers for mains and hydrants.

East Point, Ga., plans extensions and improvements in water pipe lines for supply in different parts of city; also new reservoir and other waterworks installation. About $362,000 has been secured through Federal aid.

Rocky Mount, N. C., plans pipe line extensions and improvements in water system; also other waterworks installation. Special election has been called Nov. 19 to approve bond issue of $1,200,000 for this and sewer system. J. E. Sirrine & Co., Greenville, S. C., are consulting engineers.

General Purchasing Officer, Panama Canal, Washington, asks bids until Nov. 8 for 17,000 ft. of cast iron water pipe, cement-lined; also for cast iron water pipe fittings and 17 cast iron water pipe sleeves (Schedule 4483).

Layton, Utah, plans about two and one-half miles of 4-in. pipe for water system; also new 30,000-gal. reservoir and other waterworks installation. Bond issue is being arranged and further financing will be carried out through Federal aid.

Middletown, Ill., plans pipe lines for water system and other waterworks installation, including reservoir and pumping station. Cost about $54,400. Special election has been called Nov. 26 to approve bond issue and further financing will be carried out through Federal aid.

Board of Water and Sewage Commissioners, Stevens Point, Wis., closes bids Nov. 12 for 1100 ft. of 8-in. standard cast iron pipe.

Helena, Mont., is arranging immediate call for bids for 1400 ft. of 24-in. pipe for main line from Wollsten reservoir to Holter Street. A. K. Richardson is city engineer.

Minco, Okla., plans main pipe line for water system in connection with new underground reservoir. Cost about $30,000 including pumping station. Hunter & Smith, Plaza Court Building, Oklahoma City, Okla., are consulting engineers.

Marshall, Wis., plans pipe lines for water system and other waterworks installation. Cost about $42,700. Financing has been arranged through Federal aid. General Engineering Co., Portage, Wis., is consulting engineer.

Portsmouth, Ohio, plans new 12-in. pipe from Scioto River to Custus Avenue, Nauvoo district; 8-in. pipe to end of Custus Avenue and to Poole Street, and 6-in. to Culvert's Lane, for main water supply. Cost close to $100,000. Financing is being arranged through Federal aid. C. S. Stevenson is city engineer.

Pipe Lines

Texas Cities Gas Co., Dallas Gas Building, Dallas, Tex., plans extensions and improvements in natural gas pipe line system at Galveston, Tex., including replacing of about 5000 ft. of 14-in. pressure cast iron pipe in main transmission area, and replacement of about 9500 ft. of 8-in. similar pipe in bay district; also, about 8000 ft. of 8-in. intermediate pressure lines, and close to four miles of 6-in. line, and smaller service lines. Improvements will be made in control station and other facilities. Cost about $135,000. Paul E. Nicholls is manager at Galveston.

La Gloria Corp., Robert T. Wilson, Corpus Christi, Tex., president, plans welded steel pipe for natural gas transmission to new recycling plant in La Gloria gas field, near Falfurrias, Tex., including pipe line gathering system for new wells to be drilled. Hudson Engineering Co., M. & M. Building, Houston, Tex., is engineer in charge.

Washington Water Power Co., Spokane, Wash., plans improvements in water pipe line system at Clarkston, Wash., including about 6180 ft. of 6-in. steel pipe for main line. Guy Wilson is construction superintendent in charge.

Texas Pipe Line Co., Texas Co. Building, Houston, Tex., subsidiary of Texas Co., has let contract to Williams Brothers Co., Oklahoma City, for 4-in. welded steel pipe line from new Wilson Creek, Colo., oil field to connection with pipe line system from Iles oil field, Colo., and thence to Craig, Colo., about 20 miles, for crude oil transmission to refinery of parent company at that place.

Picayune, Miss., has let contract to Littrell Contracting Co., Inc., Opelousas, La., at $186,842 for natural gas pressure pipe line system, including main welded steel pipe line for connection with supply source, control station and other operating facilities. S. Logan McConnell, 1333 Webster Street, New Orleans, is consulting engineer.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / ↓ Product	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes[2]	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE Standard cokes (Per 100-lb base box)	$5.00	$5.00	$5.00						$5.10						
BLACK PLATE 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			
TERNES, M'FG. Special coated (Per base box)	$4.30		$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢					2.40¢	2.70¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail)[7]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢							2.70¢		
PLATES									(Coatesville and Claymont = 2.10¢)						
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)										
SHAPES Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Spring	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)								
PILING Steel sheet	2.40¢	2.40¢				2.40¢					2.85¢	2.95¢			
IRON BARS Common		2.25¢			(Terre Haute, Ind. = 2.15¢)										
Refined	3.75¢														
Wrought	4.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to 29 gage within certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lots to manufacturing trade. [10] Boxed.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 4/64 in., $3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	56
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. and smaller by 6 in. and shorter	68
9/16 and ⅝ in. by 6 in. and shorter	66
¾ to 1 in. by 6 in. and shorter	64
1⅛ in. and larger, all lengths	62
All diameters over 6 in. long	62
Lag, all sizes	65
Plow bolts	68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:	
½ in. and smaller	66
9/16 to 1 in. inclusive	63
1⅛ in. to 1½ inclusive	61
1⅝ in. and larger	60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller	66	70
9/16 to 1 in.	63	65
1⅛ in. through 1½ in.	61	62
1⅝ in. and larger	60	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	72½ and 10
Stove bolts in packages, with nuts attached	72½
Stove bolts in bulk	82

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.40

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

	Per Cent Off List
Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread ¼ in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	75
Milled studs	52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Oct. 30	Oct. 31	Nov. 1	Nov. 2	Nov. 4
Copper, Electrolytic[1]	12.00	12.00	12.00	12.00	12.00
Copper Lake	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York	51.375	51.250	51.125	....	51.00
Zinc, East St. Louis[2]	7.25	7.25	7.25	7.25	7.25
Lead, St. Louis[3]	5.35	5.35	5.35	5.35	5.35

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits pig	52.25	54.50
Copper		
Electro	12.75	14.00
Castings	12.50	13.50
H. R. Sheets*	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow sheets*	18.65	18.65
Yellow, rods*	13.67	13.67
Seamless tubes*	21.40	21.40
Zinc		
Slabs	8.50	8.10
Sheets, No. 9 casks	12.50	14.00
Lead		
American pig	6.50	6.00
Bar	8.20	8.75
Cut sheets	8.50	8.75
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt., 98-99%	18.00	18.50
Solder		
½ and ½	31.25	32.25
Babbitt		
Anti-friction grade	23.50	21.75

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible	9.625	10.250
Hvy. and wire	8.625	9.025
Light and bottoms	7.625	8.125
Brass		
Heavy	5.50	6.005
Light	4.50	5.250
No. 1 yel. turn.	5.25	6.25
No. 1 red or compo. turnings	8.750	9.250
Hvy. Mach. compo.	9.125	9.50
Lead		
Heavy	4.50	5.00
Aluminum		
Cast	10.00	11.00
Sheet	13.750	14.750
Zinc	4.375	5.125

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cents plus, 18c.-19c. a lb.; No. 12 remelt No. 2 standard, 18c.-19c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $170-$173 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade ..... 2.70c.
Delivered, Detroit ..... 2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	$0.35
2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.70
2500 (5 Ni)	2.55
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.70
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.20
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20
6100 Cr-V spring steel	0.85
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c., carlots.

Alloy Steel Plates

Base per lb., f.o.b. Pittsburgh, Chicago and Coatesville.

Open hearth grade .....3.50c.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H't strip	17.00c.	17.50c.	24.00c.	35.00c.
C'ld st.	22.00c.	22.50c.	32.00c.	52.00c.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

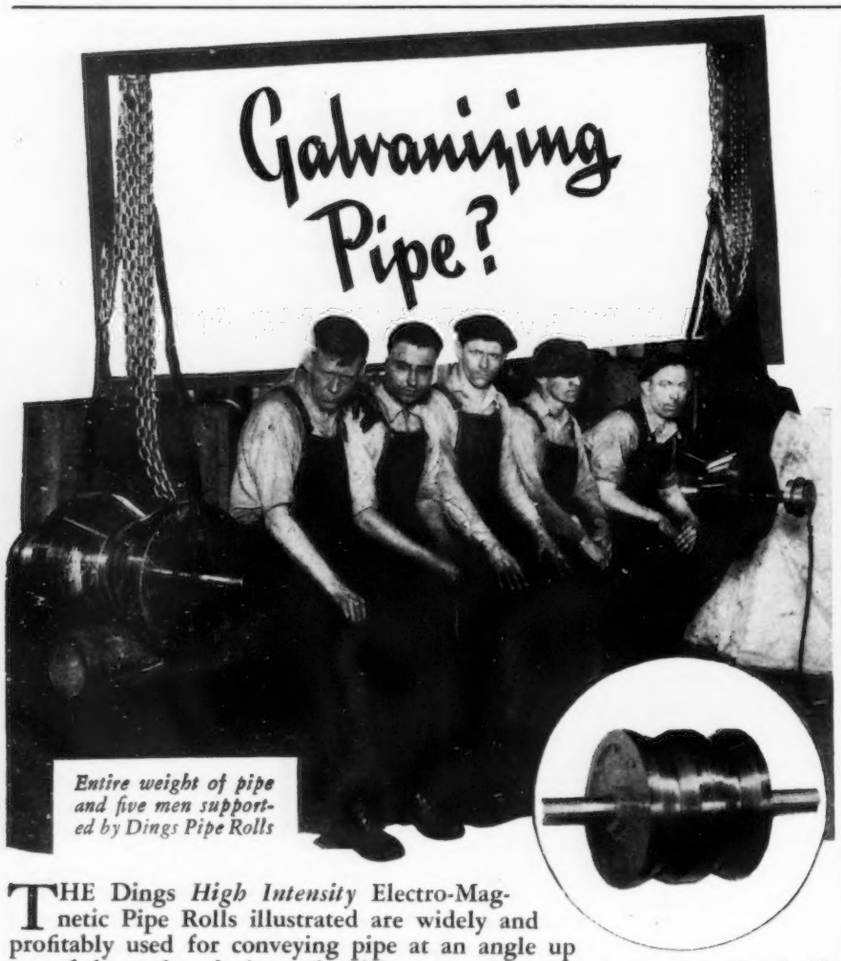
	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.



Entire weight of pipe and five men supported by Dings Pipe Rolls

THE Dings *High Intensity* Electro-Magnetic Pipe Rolls illustrated are widely and profitably used for conveying pipe at an angle up out of the spelter during galvanizing operations. Magnetic attraction holds pipe to under side of rolls which revolve and propel pipe forward. They are built to withstand the high heat of the galvanizing bath and have an extra large safety factor. Coil covers are of unusually thick bronze to resist wear. Double coils with two outside pole pieces and a strong center pole insure that the pipe will stay in position—no guides are required.

Two sizes are standard: 15″ diameter by 8″ wide for pipe up to 4″; 18″ diameter by 8″ wide for pipe up to 6″. Other sizes made to order. Double rolls are also available for handling two pipes at the same time—control of each is independent if desired. For complete information on Dings Pipe Rolls for all pipe handling jobs, write today.

Dings
MAGNETIC SEPARATION
HIGH INTENSITY

DINGS MAGNETIC SEPARATOR COMPANY
727 Smith Street, Milwaukee, Wis.

Foundry Men:

Find out about *Magnetic Drums* for removing iron from foundry sand—ask for Catalogue 660, just off the press!

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
1 in. o.d.	13 B.W.G. $9.01	$7.82	....
1¼ in. o.d.	13 B.W.G. 10.67	9.26	....
1½ in. o.d.	13 B.W.G. 11.70	10.23	$9.72
1¾ in. o.d.	13 B.W.G. 13.42	11.64	11.06
2 in. o.d.	13 B.W.G. 15.03	13.04	12.38
2¼ in. o.d.	13 B.W.G. 16.76	14.54	13.79
2¼ in. o.d.	12 B.W.G. 18.45	16.01	15.16
2½ in. o.d.	12 B.W.G. 20.21	17.54	16.58
2¾ in. o.d.	12 B.W.G. 21.42	18.59	17.54
3 in. o.d.	12 B.W.G. 22.48	19.50	18.35
3½ in. o.d.	11 B.W.G. 28.37	24.62	23.15
4 in. o.d.	10 B.W.G. 35.20	30.54	28.66
4½ in. o.d.	10 B.W.G. 43.04	37.35	35.22
5 in. o.d.	9 B.W.G. 54.01	46.87	44.25
6 in. o.d.	7 B.W.G. 82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft, to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price=$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
⅛ in.	56	36
¼ to ⅜ in.	59	43½
½ in.	63½	54
¾ in.	66½	58
1 to 3 in.	68½	60½

Wrought Iron	Black	Galv.
¼ and ⅜ in.	+9	+10
½ in.	24	6½
¾ in.	30	13
1 and 1¼ in.	34	19
1½ in.	38	21½
2 in.	37½	21

Lap Weld

Steel		
2 in.	61	52½
2½ and 3 in.	64	55½
3½ to 6 in.	66	57¼
7 and 8 in.	65	55½
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	30½	15
2½ to 3½ in.	31½	17½
4 in.	33½	21
4½ to 8 in.	32½	20
9 to 12 in.	28½	15

Butt weld, extra strong, plain ends

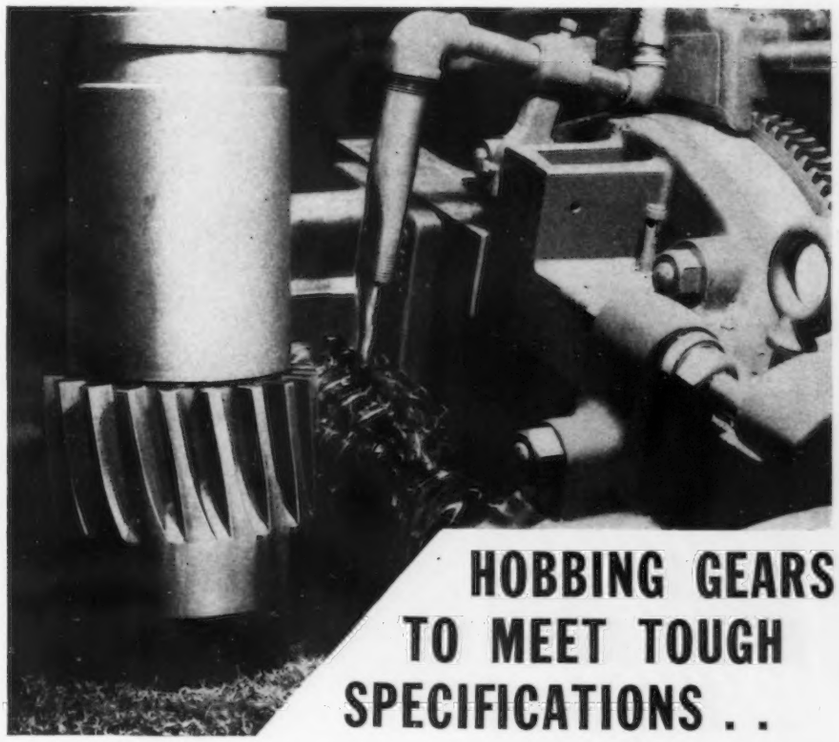
Steel	Black	Galv.
⅛ in.	54½	41½
¼ to ⅜ in.	56½	45½
½ in.	61½	53½
¾ in.	65½	57½
1 to 3 in.	67	60
Wrought Iron		
¼ and ⅜ in.	+10	+43
½ in.	25	9
¾ in.	31	15
1 to 2 in.	38	22½

Lap weld, extra strong, plain ends

Steel		
2 in.	59	51½
2½ and 3 in.	63	55½
3½ to 6 in.	66½	59
7 and 8 in.	65½	56
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	33½	18½
2½ to 4 in.	39	25½
4½ to 6 in.	37½	24
7 and 8 in.	38½	24½
9 to 12 in.	32	20½

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.



HOBBING GEARS TO MEET TOUGH SPECIFICATIONS . .

HOBBING gears of extreme hardness (325—350 Brinell) as used in oil well pumping reducers—for particularly arduous duty—was the problem of a Chicago manufacturer. In cutting and maintaining this unusual hardness and maintaining high accuracy, Cities Service oils were used as the cutting lubricant.

No doubt you have one or two like problems in your shop. Why not find out what our lubrication engineers can do for you in your own shop with the right metal cutting lubricant? Just write us to have a lubrication engineer call.

Copies of our booklet on "Metal Cutting Lubrication" are available to users of metal cutting lubricants. Write for your copy today, before the supply is exhausted.

CITIES SERVICE Cutting Oils "SERVICE PROVED"

CITIES SERVICE OIL COMPANY,
Sixty Wall Tower, Room 1626F, New York

Please send me information concerning your Lubrication Engineers' Service ☐

Please send me booklet on Metal Cutting Lubrication ☐

Name ..... Title .....

Business Address .....

Firm Name .....

City ..... State .....

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, bessemer, 51.50%..	$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%.....	4.60
Mesaba, non-bessemer, 51.50%.	4.45
High phosphorus, 51.50%.....	4.35

Foreign Ores*

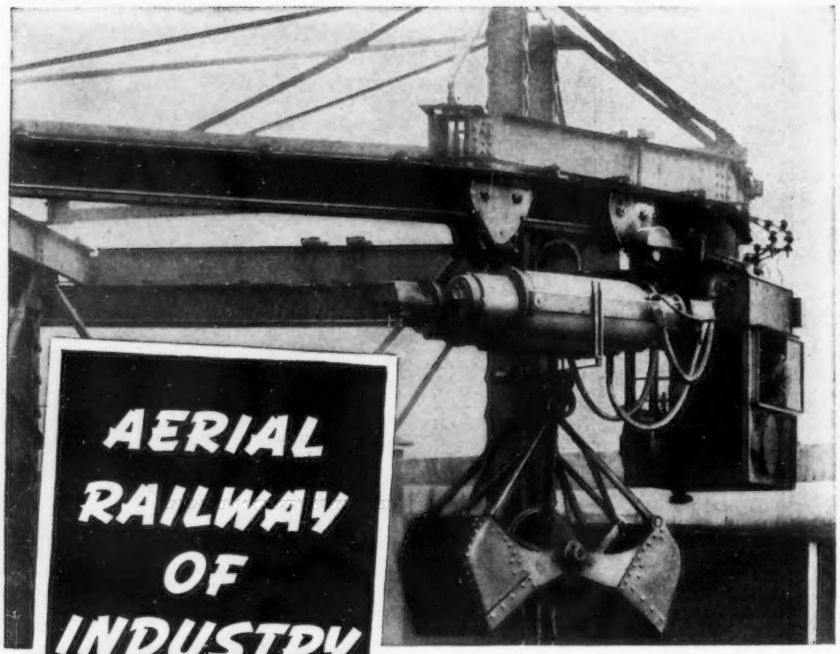
C.i.f. Philadelphia or Baltimore, Exclusive or Duty

Per Unit

Algerian, low P, Cu free, dry, 55 to 58% Fe	Nom.
Caucasian, washed, 52% Mn....	Nom.
African, Indian, 44 to 48% Mn....	50c.
African, Indian, 49 to 51% Mn....	54c.
Brazilian, 46 to 48% Mn.....	50c.
Cuban, del'd, duty free, 51% Mn..	68c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$23 to $24
Tungsten, domestic scheelite, delivered	$23.00
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	Nom.
Rhodesian, 45%	$23.50
Rhodesian, 48%	27.50



• One Shepard Niles electric monorail hoist gives "express service", indoors or out to any point in the plant or yard carrying loads of every description. Furnished with single or double hooks in capacities from ⅛ to 10 tons.

They are also ideally suited to the accurate control of any standard electromagnet or grab bucket.

Write for catalogs illustrating and describing the "Aerial Railway of Industry".

Shepard Track consisting of two special analysis T-rails clamped to the bottom flange of a standard I-beam insures a smooth, hard, long-wearing track for monorail hoists.

A COMPLETE LINE OF CRANES & HOISTS

SHEPARD NILES CRANE & HOIST CORP.

356 SCHUYLER AVENUE... MONTOUR FALLS, N. Y.

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	$40.00
Light rails (from rail steel), gross ton	39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts, steam railroads...	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)...	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR *Per Net Ton*

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	$19.00
Domestic, f.o.b. Ohio River landing barges	19.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	19.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid	Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.00
As above, in bags, f.o.b. same mines	32.60

REFRACTORIES

Fire Clay Brick *Per 1000 f.o.b. Works*

Super-duty brick at St. Louis.	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern)	8.55

Chrome Brick *Net per Ton*

Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	50.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	$72.00
Chemically Bonded, f.o.b. Baltimore	61.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....$74.50*
50% (ton lots, packed)..... 87.00*
75% (carload lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....$33.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....$27.50

For each additional 0.5% silicon up to 12%. 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon .....17.50c.
1% carbon .....18.50c.
0.10% carbon .....20.50c.
0.06% carbon .....21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon $113.00*
2.50% carbon 118.00*
2% carbon 123.00*
1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload.... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots ..... $2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....$142.50

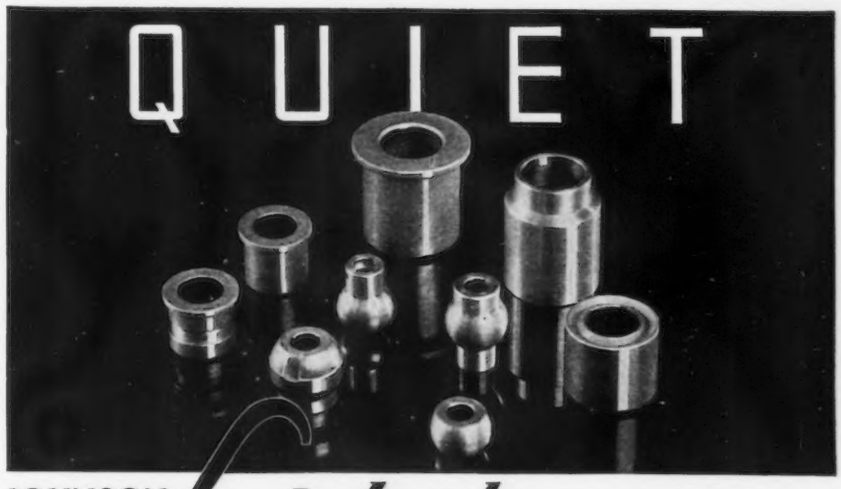
*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50
Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsato (Siglo), Tenn., 24%, per gross tons, $3 unitage, freight equalized with Nashville 75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace ..... 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.....4.10c.
No. 6, f.o.b. Bayonne, N. J.....2.98c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland..5.25c.
No. 4 industrial, del'd Cleveland.5.00c.
No. 5 industrial, del'd Cleveland.4.00c.
No. 6 industrial, del'd Cleveland.3.50c.



JOHNSON Ledaloyl SELF LUBRICATING

BEARING BRONZE

● Do you want to eliminate noise in your bearing applications? Then try LEDALOYL.

Our exclusive process of PRE-ALLOYING the basic metals prevents the formation of harmful oxides . . . assures uniform structure throughout the bearing. Likewise, it permits the introduction of lead which provides quick, easy conformability and prevents galling or freezing to the shaft. Add to this the fact that LEDALOYL contains oil . . . up to 35% by volume . . . and you realize why LEDALOYL operates so *quietly*, so efficiently and for such a long period of time.

LEDALOYL is the only self-lubricating bearing with *controlled lubrication*. Millions of pores, evenly spaced, provide pin-point lubrication to the entire bearing area. The minute size of the pores *meters* the lubricant in the exact amount required for efficient operation at all speeds and loads. Likewise, the bearing absorbs the oil when the shaft is at rest. Thus you have the right amount of oil . . . in the right place . . . at the right time.

Why not try LEDALOYL on your next application. Test it in comparison to any bearing you have ever used. Compare the operating record . . . the operating temperature . . . the life and the load carrying capacity. Convince yourself that LEDALOYL is the ideal self-lubricating bearing. Your inquiry carries no obligation.

Carried in Stock

LEDALOYL is now available from stocks conveniently located in principal industrial centers. Write for a copy of our latest catalogue listing sizes, prices and the location of your nearest source of supply

JOHNSON BRONZE
Sleeve BEARING HEADQUARTERS
505 S. MILL STREET • NEW CASTLE, PA.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt .....$4.50 to $4.75

Foundry, f.o.b. Connellsville, prompt .....$5.25 to 5.50

F'dry, by-product, Chicago..... 10.50

F'dry, by-product, New England 13.00

Foundry, by-product, Newark or Jersey City .....$11.30 to $11.90

F'dry, by-product, Philadelphia. 11.13

F'dry, by-product, Cleveland... 11.55

F'dry, by-product, Cincinnati... 11.00

Foundry, Birmingham 7.50

F'dry, by-product, St. Louis $10.75 to $11.00

Foundry, from Birmingham, f.o.b. cars dock Pacific ports.....$14.75

BRITISH

British

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export.£17 18s.

Tin plate, per base box. 32s. to 33s.

Steel bars, open hearth.£13 9s.

Beams, open hearth....£12 2s. 6d.

Channels, open hearth..£12 2s. 6d.

Angles, open hearth....£12 2s. 6d.

Black sheets, No. 24, gage £18 17s. 6d. max.*; £18 17s. 6d. min.**

Galvanized sheets, No. 24 gage £19 10s. max.*; £19 10s. min.**

*Empire markets only.
**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	***$24.50***	***$24.00***	***$25.50***	***$25.00***	.....
Brooklyn	***26.50***	.....	.....	***27.00***	.....
Jersey City	***25.53***	***25.03***	***26.53***	***26.03***	.....
Philadelphia	***24.84***	***24.34***	***25.84***	***25.34***	.....
Bethlehem, Pa.	$24.00	$23.50	$25.00	$24.50	.....
Everett, Mass.	24.00	23.50	25.00	24.50	.....
Swedeland, Pa.	24.00	23.50	25.00	24.50	.....
Steelton, Pa.	.....	23.50	.....	.....	28.50
Birdsboro, Pa.	24.00	23.50	25.00	24.50	28.50
Sparrows Point, Md.	24.00	23.50	.....	.....	.....
Erie, Pa.	23.00	22.50	24.00	23.50	.....
Neville Island, Pa.	23.00	22.50	23.50	23.00	.....
Sharpsville, Pa.	23.00	22.50	23.50	23.00	.....
Buffalo	23.00	22.00	24.00	23.50	28.50
Cincinnati	***23.44***	***23.61***	.....	***24.11***	.....
Canton, Ohio	***24.39***	***23.89***	***24.89***	***24.39***	.....
Mansfield, Ohio	***24.94***	***24.44***	***25.44***	***24.94***	.....
St. Louis	***23.50***	***23.02***	.....	.....	.....
Chicago	23.00	22.50	23.50	23.00	.....
Granite City, Ill.	23.00	22.50	23.50	23.00	.....
Cleveland	23.00	22.50	23.50	23.00	.....
Hamilton, Ohio	23.00	22.50	.....	23.00	.....
Toledo	23.00	22.50	23.50	23.00	.....
Youngstown	23.00	22.50	23.50	23.00	.....
Detroit	23.00	22.50	23.50	23.00	.....
St. Paul	***25.63***	.....	***26.13***	***25.63***	.....
Duluth	23.50	.....	24.00	23.50	.....
Birmingham	19.38*	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle	***27.50***	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal†	27.50	27.50	.....	28.00	.....
Toronto†	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....$22.50

CHARCOAL

Lake Superior fce.....$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

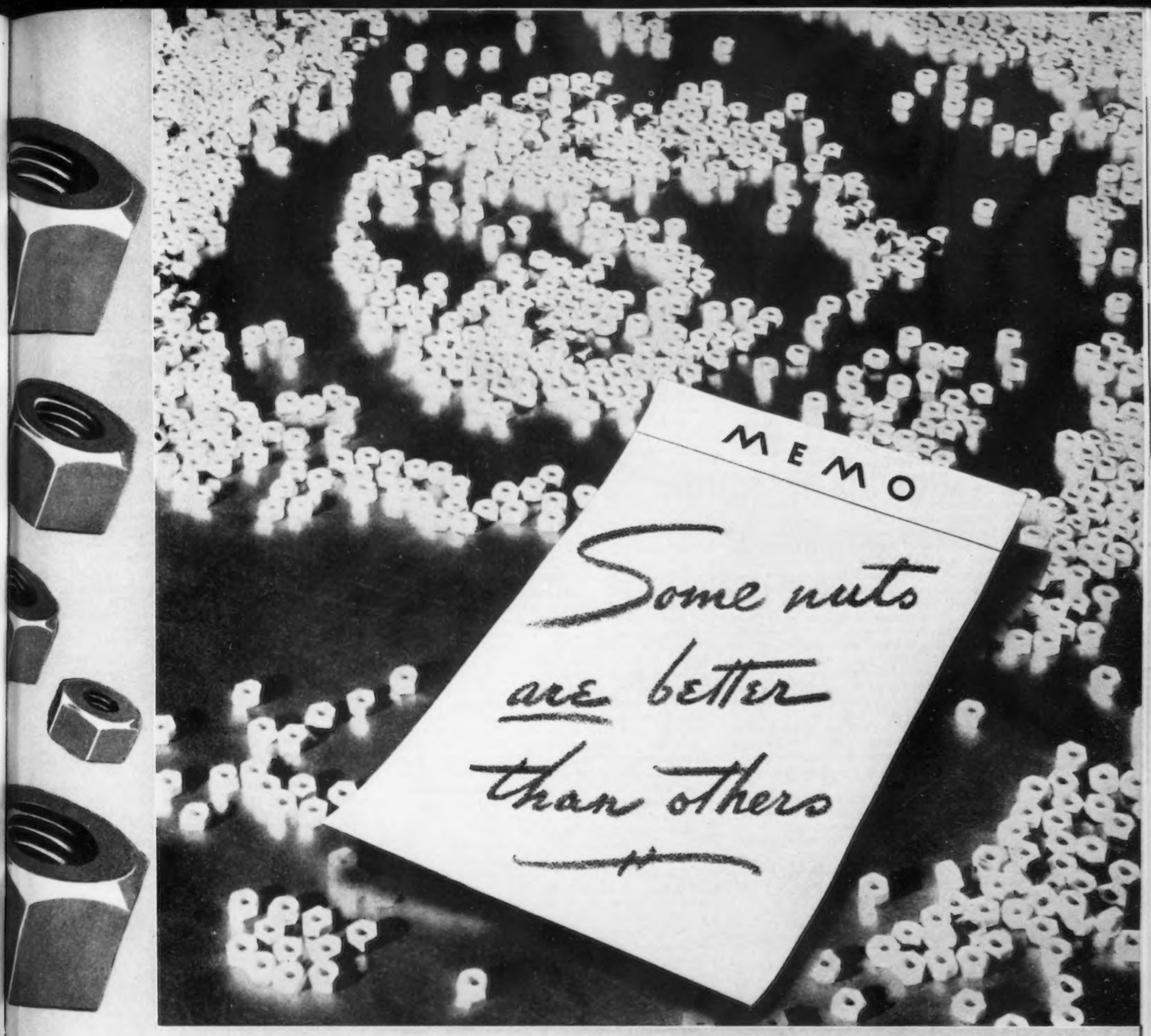
*Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

WAREHOUSE PRICES

(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.15	$3.05	$3.15	$3.35	$3.38	$3.23	$3.05	$3.51	$3.45	$3.18	$3.30	$3.48	$4.30
Sheets, cold rolled	....	4.10	4.05	4.05	4.40	4.30	4.30	4.58	....	4.12	4.35	4.43	6.50
Sheets, galvanized	4.75	4.60	4.42	4.75	4.55	4.64	4.00	4.66	4.75	4.95	4.75	4.98	5.25
Strip, hot rolled	3.40	3.40	3.30	3.75	3.76	3.48*	3.62	3.86	3.70	3.52	3.65	3.73	....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.31	3.20	3.22	3.26	....	3.41	3.83	3.54	....
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	*3.47	3.80	3.68	4.00
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.62	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.55	7.31	7.35	7.42	7.35	7.50	....	7.47	7.45	7.33	9.40
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.15	8.15	8.15	8.56	8.59	8.45	8.40	8.63	....	8.52	8.84	8.38	10.65
Bars, cd. drn. SAE 3100	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions; Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.23.



FOR proof that some nuts are better than others, no more outstanding example could be chosen than EMPIRE Cold Punched Nuts.

Because of the demands of American industry for a truly superior product, RB&W built at Coraopolis, Pa., the largest and most modern nut manufacturing plant in the world, and the only plant in the United States devoted exclusively to the manufacture of nuts. Here all administrative and production facilities are concentrated on a single product—special machinery, neither duplicated nor equalled elsewhere, has been developed only for making that product—every energy is focused on the manufacture of better nuts!

In the manufacture of EMPIRE Cold Punched Nuts, punching is done at right angles to the flow lines of the steel, eliminating danger of stripping or splitting. Then the nuts are repunched, an exclusive RB&W operation that accurately centers and finishes the hole. A burnishing operation, originated by RB&W, gives "semi-finished" nuts a flawless plate-like finish. Tapping by a principle developed at RB&W produces precise accuracy and cleanness of thread. A remarkable intra-plant transportation system governs all these processes through to the final operation of dating each keg the moment it is packed, insuring rapid, accurate delivery to the buyer of a nut that *is* better.

BOLTS EMPIRE NUTS-RIVETS

RUSSELL, BURDSALL & WARD
BOLT AND NUT COMPANY

PORT CHESTER, N. Y. ROCK FALLS, ILL. CORAOPOLIS, PA.

Sales Possibilities

. . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

● **High Standard Mfg. Co., Inc.,** Foote Street, New Haven, Conn., automatic pistols, special deep-hole drills, etc., has let general contract to Dwight Building Co., 67 Church Street, for new one-story plant, about 100,000 sq. ft. of floor space, at Hamden, Conn., for production of machine guns and parts for Government. Cost close to $500,000 with equipment. Douglas Orr is company architect.

Pratt & Whitney Division, Niles-Bement-Pond Co., Inc., West Hartford, Conn., has let general contract to James Stewart & Co., 230 Park Avenue, New York, for one-story addition, 200 x 240 ft., for expansion in production, storage and distribution departments. Cost close to $175,000 with equipment. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 12 for bronze pipe flanges for Portsmouth, N. H., and Mare Island Navy Yards (Schedule 3793).

Cranston Arms Co., Cranston, R. I., recently organized by officials of Universal Winding Co., Cranston, textile products, will take over mill property of parent company for manufacture of automatic rifles, parts production and assembling. Equipment will be installed for employment of about 300 persons. Proposed to have plant ready for operation early in 1941.

Public Works Officer, Portsmouth, N. H., Navy Yard, will make extensions and improvements in fitting-out ship-building berth, for which fund of $275,000 has been authorized.

Chromium Process Co., Shelton, Conn., metal plated products, has let general contract to Max Durrschmidt, Derby, Conn., for two-story addition. Cost about $40,000 with equipment. Leo F. Caproni, 1221 Chapel Street, New Haven, Conn., is architect and engineer.

Continental Can Co., 100 East Forty-second Street, New York, has acquired about 15 acres on North Broadway, St. Louis, for new plant for storage, distribution and other service, to include machine shop, power house and other mechanical departments. Cost close to $1,000,000 with equipment. Company is now operating a St. Louis plant at 5221 Natural Bridge Avenue.

Behr-Manning Corp., Tenth Avenue, Troy, N. Y., grinders, abrasive products, etc., has let general contract to Morton C. Tuttle Co., Park Square Building, Boston, for four-story and basement addition. Cost close to $90,000 with equipment. Company is a subsidiary of Norton Co., Worcester, Mass.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 15 for 18,500 aluminum powder containers for Iona Island, N. Y., Portsmouth, Va., and Mare Island yards; about 460,000 cartridge containers for Eastern and Western yards (Schedule 3821).

G.V.S. Corp., New Rochelle, N. Y., Pierre Verneuil, president, recently organized, has leased former local plant of American Radiator & Standard Sanitary Corp., at 22 Avenue E, about 16,500 sq. ft. of floor space, for production of electro-plated nuts and bolts, and kindred specialties.

Rollway Bearing Co., 541 Seymour Street, Syracuse, N. Y., roller bearings, etc., has let general contract to Byrne Construction Co., 411 Roberts Avenue, for one-story addition. Cost over $50,000 with equipment. W. C. Moulton, Hills Building, is architect.

Curtiss-Wright Corp., 30 Rockefeller Plaza, New York, airplanes and parts, has taken over tract at Port Columbus, Columbus, Ohio, for branch plant for production of military aircraft. It will consist of main one-story unit, 600 x 1400 ft., for parts production and assembling; one-story engineering building, 100 x 900 ft.; one-story storage and distributing structures, power house and office, 50 x 400 ft. Cost about $10,000,000 with equipment. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer.

Public Works Officer, Naval Ammunition Depot, Lake Denmark, N. J., plans extensions and improvements in power house, including additional equipment; also extensions and improvements in steam-distribution system, and installation of equipment in a storage building. Appropriation of $92,000 has been authorized for work.

Republic Aviation Corp., Farmingdale, N. Y., has plans by Albert Kahn Associated Architects & Engineers, Inc., Detroit, for new plant at East Farmingdale for parts production, assembling and testing divisions. Cost close to $9,000,000 with equipment.

Jamestown Metal Equipment Co., Allen Street, Jamestown, N. Y., automobile radiators and other metal products, has revised plans for one-story addition, 240 x 700 ft. Bids recently received were rejected. Cost over $500,000 with equipment.

Worthington Pump & Machinery Corp., Worthington Avenue, Harrison, N. J., pumps, engines and kindred products, has let general contract to Wigton-Abbott Corp., 60 East Forty-second Street, New York, for one-story addition, 105 x 180 ft., primarily for a welding works. Cost over $85,000 with equipment.

American Type Founders, Inc., 200 Elmora Avenue, Elizabeth, N. J., has let general contract to H. K. Ferguson Co., Hanna Building, Cleveland, for one-story addition, 200 x 300 ft. Cost over $125,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Nov. 11 for shovels (Circular 1002); until Nov. 12, one wood-turning lathe (Circular 999).

Sharples Corp., Twenty-third and Westmoreland Streets, Philadelphia, centrifugal machinery and parts, dryers, etc., has let general contract to Barclay, White & Co., 22 North Thirty-sixth Street, for one-story addition, 80 x 110 ft. Cost over $65,000 with equipment. Pennell & Wiltberger, Land Title Building, are engineers.

Reading Sheet Metal Products Co., Inc., Reading, Pa., plans one-story addition. Cost over $50,000 with equipment.

Aluminum Co. of America, Inc., Gulf Building, Pittsburgh, has let contract to Converse Bridge & Steel Co., Chattanooga, Tenn., for addition to branch mill at Alcoa, Tenn. Cost over $750,000 with equipment.

United Refining Co., Warren, Pa., plans expansion and improvements in oil refinery, including equipment. Cost over $85,000 with equipment.

Joy Mfg. Co., Franklin, Pa., conveyors, loading machines, etc., has let general contract to H. T. Osborn Co., 1421 Liberty Street, for one-story addition, 90 x 200 ft., instead of smaller size previously noted. Cost close to $80,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for stoker-fired boiler, forced and induced-draft fans, stokers, economizer, combustion control equipment, instruments and auxiliary equipment for power house at local navy yard (Specifications 10128); also bids (no closing date stated) for extensions in naval research laboratory, Bellevue, D. C. (Specifications 10033).

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Nov. 12 for one aniline storage tank and one caustic storage tank (Circular 529), 34 indicator tables (Circular 517); until Nov. 13, two slurrifiers and two lead-lined reactors (Circular 523); until Nov. 15, screening and pulverizing equipment (Circular 530); until Nov. 14, storage tank (Circular 532), vacuum filters (Circular 531); until Nov. 20, three truck and tray-type dryer units, and five sets of trucks and trays, complete (Circular 518), one vacuum distillation unit (Circular 533).

Cambridge Iron & Metal Co., 2032 Aliceanna Street, Baltimore, plans one-story addition for storage and distribution. Cost close to $40,000 with equipment.

Federal Security Agency, Food and Drug Administration, South Agriculture Building, Washington, asks bids until Nov. 14 for temperature and humidity control washer system in sub-basement of building of Department of Agriculture.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 12 for key-seating machine (Schedule 3784), press-forming brake (Schedule 3783), pattern-maker's lathe (Schedule 3758), all motor-driven; dies, diestocks, taps, threading sets and tap wrenches (Schedule 3766), countersinks and reamers (Schedule 3735), oxy-acetylene gas-cutting machine, tracing and works support table (Schedule 3785), chains, rings, shackles, anchors, etc. (Schedule 3777), augers, wood boring bits, chisels, knives, etc. (Schedule 3773), wire rope, spreader and clips, jackstays, etc. (Schedule 3782) for Eastern and Western yards.

Star Engineering Co., Newark, N. J., recently organized to manufacture tools, machinery and aircraft accessories, has leased space at 85 Chestnut Street for plant.

Glyco Products Co., 148 Lafayette Street, New York, chemicals, has approved plans for new building in Brooklyn, to include administrative, research laboratory and manufacturing divisions.

The South

● **International Harvester Co.,** 180 North Michigan Avenue, Chicago, Motor Truck Division, has asked bids on general contract for one and two-story factory branch, storage and distributing plant, with service and repair departments, at Shreveport, La. Cost close to $100,000 with equipment.

Hercules Powder Co., Delaware Trust Building, Wilmington, Del., will make enlargements in new smokeless powder works now in course of construction near Radford, Va., with output for Government. Additional production units, shops, storage and distributing buildings will be erected, also power house extension and other facilities to double initial estimated capacity. Cost $10,000,000 and fund in that amount has been approved by War Department. Initial plant, with appropriation from same source, will cost approximately $25,000,000, making a total of $35,000,000 for project.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for lubricating oil system and extension in gasoline system, including tanks, piping and other equipment and facilities at Naval air station, Jacksonville, Fla. (Specifications 10181).

A. S. LaNasa Bakery, Inc., 6117 St. Claude Avenue, New Orleans, has asked bids on general contract for one-story addition to baking plant, 60 x 120 ft. Cost close to $50,000 with traveling oven, conveyors and other mechanical-handling facilities. W. E. Long Co., 155 North Clark Street, Chicago, is engineer.

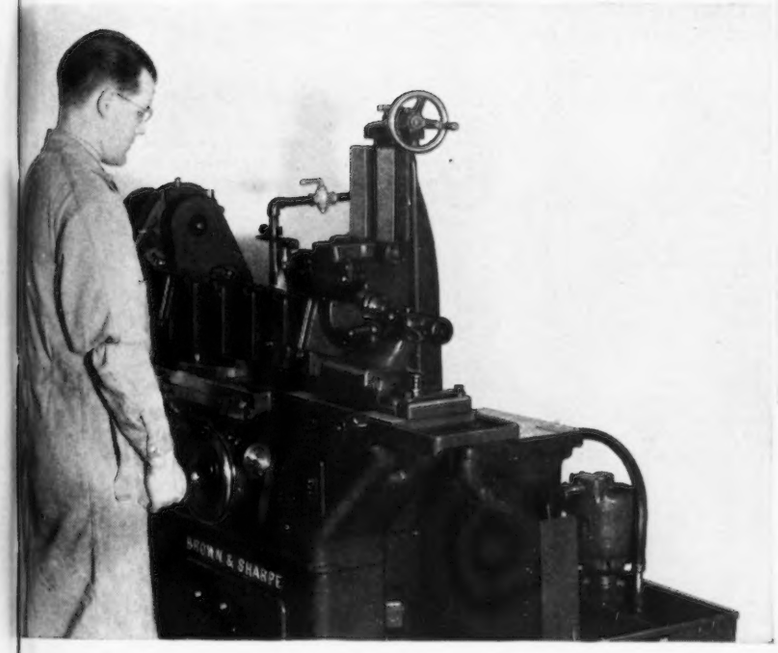
Florida Power & Light Co., Miami, Fla., is considering new steam-electric generating station at Miami Beach, Fla., installation to

MODERN CUTTER AND TOOL GRINDING REQUIRES EXACTING MACHINES

– No. 10 Cutter & Tool Grinding Machine - - to improve the production of your milling departments by keeping cutters in efficient cutting condition.

– No. 13 Universal & Tool Grinding Machine - - for general purpose toolroom grinding, sharpening cutters, reamers and other cutting tools — and for small cylindrical work.

At right — Sensitive, easily operated controls and convenient adjustments of the No. 10 simplify accurate cutter and tool sharpening.



Above — A wide selection of additional equipment, such as the Wet Grinding Attachment shown, adapts the No. 13 to practically every type of toolroom grinding operation.

Simplicity of design – ease of set-up and operation – wide versatility – long-lived accuracy . . . features which mean reduced costs and fast and accurate output – all are found on both these money-saving machines. Ask for literature which includes complete description of the many available attachments. Brown & Sharpe Mfg. Co., Providence, R. I., U. S. A.

B·S

BROWN & SHARPE

include turbine-generating units, high-pressure boilers and auxiliary equipment. Cost close to $2,500,000. Proposed to begin work in 1941.

War Department, Washington, plans new ammunition storage depot near Fort McClellan, Calhoun County, Ala., where about 10,000 acres is being acquired. Project will include one and multi-story buildings, with mechanical-handling facilities for shells, air bombs, etc.; also administration building, shops and other structures. Fund of $12,400,000 is being appropriated for project.

Central States

• **Logan-Long Co.,** 37 West Van Buren Street, Chicago, roofing products, will take bids soon on general contract for one-story addition to plant at Franklin, Ohio, for storage and distribution. Cost close to $50,000 with equipment. McKeown Brothers Co., 5235 South Keeler Street, Chicago, is engineer.

Aeroproducts Division, General Motors Corp., 228 East First Street, Dayton, Ohio, aircraft equipment, has let general contract to Frank Messer & Sons, Inc., 2515 Burnet Avenue, Cincinnati, for new plant near municipal airport, including two-story office and service building adjoining. Cost over $500,000 with equipment. Construction Division, Argonaut Realty Division, General Motors Research Building, Detroit, is engineer.

Bellows-Claude Neon Co., 861 East Talmadge Avenue, Akron, Ohio, lighting equipment, will take bids soon on general contract for new one-story plant, 65 x 85 ft. Cost about $45,000 with equipment. E. V. Florence, 640 North Main Street, is architect.

Diesel Engine Division, General Motors Corp., 2160 West 106th Street, Cleveland, is erecting one-story addition, 100 x 290 ft., for which general contract recently was let to Austin Co. Cost over $350,000 with equipment.

Hilton-Davis Chemical Co., Langdon Farm Road, Cincinnati, industrial chemicals, etc., has let general contract to H. & F. H. Hosea Co., 626 Broadway, for one-story addition, 155 x 295 ft., for storage and distribution. Cost close to $100,000 with equipment.

O'Brien Varnish Co., 101 Johnson Street, South Bend, Ind., paints, varnishes, oils, etc., has let general contract to Sollitt Construction Co., 518 East Sample Street, for one and two-story addition, about 35,000 sq. ft. of floor space. Cost about $85,000 with equipment. Morton L. Pereira, 100 West Monroe Street, Chicago, is architect.

Atlas Powder Co., Delaware Trust Building, Wilmington, Del., has contracted with War Department, Washington, for large plant at Weldon Springs, Mo., near St. Louis, for production of high explosives for Government. About 20,000 acres is being acquired. It will consist of one and multi-story buildings, shops, administration building, power house, pumping station and other mechanical structures, and will cost about $15,000,000, which will be furnished by War Department. Plant will be operated by Atlas company under lease agreement.

Thurmaduke Corp., an interest of Duke Mfg. Co., 2217 North Broadway, St. Louis, hotel and restaurant equipment, has asked bids on general contract for one-story plant at Broadway and Monroe Street, 158 x 177 ft. Cost close to $100,000 with equipment.

North American Aviation, Inc., Inglewood, Cal., has plans by Lloyd Allen and John R. Kelley, Architects' & Builders' Building, Indianapolis, architects, for branch plant near Hensley air field, Dallas, Tex., for production of military aircraft for Government, comprising six main one-story units, 900 x 950 ft., for general assembling; 100 x 250 ft., for foundry; 100 x 150 ft., for drop hammer and forge works; 100 x 100 ft., for storage and distribution; 160 x 325 ft. steel hangar; and power house, 59 x 119 ft. Also for two-story office and administration building, 50 x 150 ft. Cost about $6,000,000 with equipment. Gordon Turnbull, Indianapolis address noted, is consulting engineer.

Lone Star Brewing Co., San Antonio, Tex., plans expansion and improvements, including equipment, to double present production. Also will build new storage and distributing building to increase facilities from 45,000 to 90,000 bbl. per annum. Cost over $100,000 with equipment.

Colonial Broach Co., 147 Joseph Campeau Avenue, Detroit, has let general contract to William F. Demske, Majestic Building, for one-story addition. Cost about $50,000 with equipment.

Monsanto Chemical Co., 1700 South Second Street, St. Louis, industrial chemicals, has let general contract to Bryant & Detwiler Co., Penobscot Building, Detroit, for foundations for new plant at Trenton, Mich., where large tract recently was acquired. It will comprise one and multi-story production units, storage and distributing buildings, machine shop, power house, pumping station, administration and office building and auxiliary structures. Cost close to $2,500,000 with equipment.

Aeronautical Products, Inc., 18102 Ryan Street, Detroit, aircraft parts and equipment, plans one-story addition. Cost over $65,000 with equipment. Company previously was known as Machining & Grinding Co.

West Shore Machine Works, Inc., Muskegon, Mich., recently organized, has filed plans for new one-story plant for production of machine parts and other mechanical equipment. Cost about $40,000 with equipment. Joseph Zura, Jr., and Harold Puehler are heads.

A. Finkl & Sons Co., 2011 North Southport Avenue, Chicago, forgings and other iron and steel products, has let general contract to E. L. Hallbauer Construction Co., 452 West Belden Avenue, for one-story addition, 76 x 160 ft., for a heat-treating unit. Cost over $85,000 with equipment. Morton L. Pereira, 100 West Monroe Street, is architect.

Barnes Drill Co., 814 Chestnut Street, Rockford, Ill., has let general contract to Schmeling & Sons, Inc., 1031 School Street, for one-story addition, 50 x 145 ft., for storage and distribution. Cost close to $50,000 with equipment.

Bastian-Blessing Co., 240 East Ontario Street, Chicago, soda fountain equipment, carbonic gas apparatus, etc., has let general contract to Avery, Brundage & Co., 11 South LaSalle Street, for new one-story plant, 400 x 450 ft., at Peterson and Rogers Avenues. Cost over $450,000 with equipment. Fox & Fox, 549 West Randolph Street, are architects.

Chain Belt Co., 1600 West Bruce Street, Milwaukee, conveying and transmission equipment, etc., has taken bids for foundations for one-story addition, 60 x 150 ft. Cost over $85,000 with equipment. Eschweiler & Eschweiler, 720 East Mason Street, are architects.

Leatham Smith Coal & Shipbuilding Co., Sturgeon Bay, Wis., plans expansion in shipyard for production of all-welded harbor tugs for Army Department, Washington, including one-story main shop for welding service. Cost over $60,000 with equipment.

Sherwin-Williams Co., South Cottage Grove Avenue and East 115th Street, Chicago, paints, varnishes, oils, etc., has let general contract to W. E. O'Neil Construction Co., 2721 Clybourn Avenue, for one-story storage and distributing plant, 330 x 700 ft. Cost over $650,000 with equipment. Main offices are at Cleveland.

Louis Allis Co., 427 East Stewart Street, Milwaukee, motors, parts and kindred equipment, has let general contract to Henry Danischefsky, 3440 North Dousman Street, for one-story addition, 97 x 100 ft. Cost over $45,000 with equipment. E. J. Schrang, 4415 North Oakland Avenue, is architect.

Mississippi Valley Public Service Co., Winona, Minn., is considering expansion and improvements in steam-electric generating plant, to include new turbine-generator unit and accessories, high-pressure boiler and auxiliary equipment. Cost close to $1,000,000.

Western States

• **Columbia Stamping & Mfg. Co.,** 2936 South Western Avenue, Los Angeles, metal stampings, etc., has let general contract to Miller-Saunders Co., 7278 Melrose Avenue, for one-story machine shop, 86 x 190 ft., at 8719 Crocker Street. Cost close to $60,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for diesel-electric traveling crane, hammerhead-type, for Mare Island Navy Yard (Specifications 10165).

Columbia Steel Co., Russ Building, San Francisco, has let general contract to Barrett & Hilp, 918 Harrison Street, for one-story addition to plant at Sixteenth and Folsom Streets, for storage and distribution. Cost close to $90,000 with mechanical-handling and other equipment.

Aluminum Co. of America, Inc., Gulf Building, Pittsburgh, plans three one-story additions to new plant near Vancouver, Wash., for fabricating units for production of aircraft parts for military planes; all equipment to be electric-operated. Cost over $2,500,000 with equipment. Contract has been made with Administrator, Bonneville project, Portland, for increased power supply from Bonneville transmission system.

Puget Sound Pulp & Timber Co., Bellingham, Wash., has let general contract to Howard S. Wright Co., 407 Yale Avenue North, Seattle, for additions to sulphite pulp mill, consisting of machine room, 80 x 340 ft.; digester building, 40 x 72 ft.; addition to boiler plant, 28 x 40 ft.; two acid towers, two sulphur silos and other facilities. Cost about $1,500,000, of which machinery purchases will represent close to $1,250,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 12 for 2000 oxygen cylinder valves for San Diego Naval Air Station and Philadelphia Navy Yard (Schedule 3772).

Ducommun Metals & Supply Co., 219 South Central Avenue, Los Angeles, has asked bids on general contract for new two-story storage and distributing plant at Alameda Avenue and Forty-ninth Street, with one-story structure adjoining for similar service, about 100,000 sq. ft. floor space in all. Cost over $200,000 with equipment. Albert C. Martin, Higgins Building, is architect.

Canada

• **Wallace Barnes Co., Ltd.,** Sherman Avenue North, Hamilton, Ont., steel springs and wire products, has let general contract to Cooper Construction Co., Medical Arts Building, for three-story and basement addition, 65 x 120 ft. Cost close to $125,000 with equipment.

Small Electric Motors (Canada), Ltd., Toronto, Ont., recently organized as a subsidiary of Small Electric Motors, Ltd., Beckenham, England, industrial motors and other electrical equipment, is erecting one-story plant on about one and one-half acres on Vanderhoof Avenue, Leaside district, lately acquired. Cost over $85,000 with equipment. W. C. T. Cran is one of heads of company.

Atlas Steels, Ltd., Main Street, Welland, Ont., has approved plans for one-story addition, 200 x 800 ft. Cost over $500,000 with equipment.

Kelvinator of Canada, Ltd., Dundas Street East, London, Ont., will start work immediately on one-story addition, 34 x 110 ft. Hyatt Brothers, 290 Egerton Avenue, are general contractors.

P. L. Robertson Screw Mfg. Co., Milton, Ont., will start work at once on one-story, 60 x 60 ft. plant addition. Cost with equipment about $50,000.

Sidney Roofing & Paper Co., Ltd., Hospital Point, Victoria, B. C., has let contract to Parfitt Brothers, Ltd., 1405 Douglas Street, for paper mill to cost $46,000. J. G. Johnson, Scollard Building, is architect.